Shall We, or Shall We Not, Enjoy?

BECKFORD'S celebrated house and park, Fonthill, England, is now in complete ruins. The publication of his life has just brought out some recollections of the man and the place, which are interesting. The grounds of that once celebrated spot are now a tangled mass of overgrown woods, bound and clamped with brambles. The nine miles of drive, along which his four gray ponies used to pad and trot, are now chopped up into three estates. The great abbey, the country neighbors think, cost a million of pounds; it rose like an exhalation, and passed away like a summer cloud. One turret gallery alone stands as a place for picnics, and the roads are rutted deep with wagons carrying stones. The agate cups, gold lamps, proof engravings and fine pictures, and all such rarities, are scattered to the four winds, just like his old rival Horace Walpole's; and now the bleak wind, whistling from the broad, crop-eared Wiltshire downs, keeps rumbling and muttering in every blast, "vanity of vanities: all is vanity and vexation of spirit."

Contrast this idiot's vain expense with the following pretty little cabinet picture from the autobiography of Mary Anne Schimmelpenninck, lately republished in America:

"In this happy valley, Richard Reynolds occupied the principal mansion. My cousin Priscilla was on terms of intimate friendship with him and his wife, and they gladly made an arrangement to receive her at their house as her future home, (for a lifetime). She had her sitting-room and bedroom, and one adjoining for her little maid Joan,—a stable for her horse 'Serena,' and her open carriage, in which she so often used to drive about to visit the poor and enjoy the country. Besides this, Richard Reynolds and his wife formed for her what catholics would call a *solitude*, a walk through a thick grove which terminated in a verdant, open space, where was a rill and cascade falling through the rocks into the river below; here was a sort of open summer-house, and behind it were two more substantial rooms, one of which was furnished with books, writing materials, and everything suitable for contemplation and solitary employment. The other was a little apartment in which Joan was ensconced with her book and her needle, when her presence was not needed by her mistress. Such was the principal home of my cousin, Priscilla Gurney."

The same author, on her first visit to Liverpool, remarks: "I was amazed to see the sumptuous drawing-rooms, rich with satin and silk, in houses where there was no library, and at the large assembly of gaily-dressed and jewelled visitors, many of whom seemed to think that books were as much a superfluity as the great Pascal esteemed brooms and towels."

We do not ask our readers which is preferable,—the gorgeous hangings and mirrors, or a library reflecting like mirrors the greatest minds.

The mistake which many Americans commit in thinking that money with-

out mental cultivation confers happiness, is a fatal one. "Enough is plenty," and with this fully believed in, how many that desire "more" might have been saved from want. The prizes of life are in general not worth the sacrifices paid for them. A man spends all his best days in the uncertain pursuit of riches, or mayhap in the bustle of politics; he wriggles his way to the best places in the State, it may be to the Senate, or a Governor's seat; or he becomes a commercial millionaire: well, he goes into retirement at sixty, but it is a fact that the cultivated resident of the country understands better the meanings of spring, summer, autumn, and winter, than such a man; and nothing that wealth can bring can counterpoise such a source of enjoyment. "Thus you can understand," says a favorite writer, "how I can afford to pity the man on the woolsack, while the May-fly is on the waters." Were the sacrifice of nature made for some everlasting good, there would be some sense in it; for temporal and temporary advantages to make it, is consummate folly. Those who do not live with nature through this present June, will never see another like it; for they will be older next year, and the sight and smell of the lilac and rose, and the song of the wren and blue bird, will have lost some bloom and freshness, and suffered for them a little, however inappreciable, diminution in richness and melody.

THE MORGAN PEAR.*

The Morgan Pear originated in New Hanover County, N. C., on the farm of a Mr. Morgan, since dead, and was introduced into notice by the Hon. W. B. Mears, a lawyer of distinction in that State. The specimens from which the drawing is made, were received from Dr. H. A. Bizzell, an enthusiastic amateur pomologist of Sampson Co., and to whom we are indebted for its history as well as for other like favors.

The specimens vary in size from eight inches to twelve and three-quarters in circumference; we had two of the latter size. In form it is oblate, varying to obtuse pyriform; stem slender, and about one inch in length; basin abrupt and deep; calyx small, and destitute of segments; color greenish yellow, specked with grey russet specks, intermingled with a little tracery of the same; size large, to very large; flavor sweet, juicy, slightly vinous; flesh white, and a little gritty. Ripens during the month of October. Quality *very good*, nearly *best*; better than either Louise Bonne de Jersey or Duchess D'Angoulème. Will not grow on the quince.

The tree is a fine grower; young wood olive green, with white specks; leaves lanceolate and slightly serrated. J. Van Buren.

Clarkesville, Ga.

[We are much indebted to Mr. Van Buren for this and other drawings, &c., and trust that he will continue his favors.]

* See Frontispiece.

THE ORCHARD HOUSE, OR THE CULTIVATION OF FRUIT TREES IN POTS UNDER GLASS.

BY THOMAS RIVERS, OF THE NURSERIES, SAWBRIDGEWORTH, HERTS.

From the Fifth London Edition, 1858.

A few words of preface and apology to the first edition.—It has been, and is, too often the custom of writers on horticulture and agriculture, to write first and practice afterwards,—in other words, to promulgate a pretty theory, and then reduce it to practice: I have not been "to this manner given," for in this, as well as in other instances, I have reduced my practice to writing. The method of culture given in the following pages, has been to me a pléasant relaxation from the cares of an extensive business; and I feel convinced that it may be made equally agreeable to a numerous class of busy men, who make their gardens a source of untiring, quiet enjoyment.

It is very probable that some who may be tempted to read the following pages will feel surprised that I have made a separate publication on so trifling a subject, when so many horticultural periodicals are open to those who cannot write a large book. They may say, "Why not occupy a few columns in the 'Gardeners' Chronicle,' or a few pages in the 'Cottage Gardener?'" My motive must be my apology.

For many years our parish church, from causes not proper to be mentioned here, was in a fearfully dilapidated state: a partial repair has rescued it ro m serious consequences; still, much more is required. A hint from one warmly and actively interested in its restoration has induced me to dedicate the profits resulting from this little publication towards such a sacred and, I trust, praiseworthy object. I hope not to be misunderstood. It is not ostentation that has tempted me to this; no love of fame, but purely the wish to disseminate a taste for refined horticultural pursuits, and a hope that I, a humble agent, may be, through this, enabled to contribute a trifle towards the restoration of the church of my forefathers, and, I trust, of my children's children.

The same to the fifth edition.—When I ventured to publish the first edition of this little work, I scarcely dared to hope that it would meet with a reception so favorable, and fulfil so quickly the purpose to which it was dedicated. Orchard houses are now familiar things: hundreds are rising up all over the face of the country: no garden structures have ever so rapidly advanced in popularity. That they deserve to be popular, I am more than ever convinced; and I cannot help feeling grateful that, through the exercise of my humble literary ability, so much good, because so much intellectual pleasure, has been derived from this new mode of cultivating fruit trees. In the following pages it will be seen that the idea has not "grown with my growth,"—for I am old and grey-headed,—but rather with my age.

We are, however, as yet only children in orchard-house culture. Every moderate sized garden in England—more particularly in the North—and in Scotland, will, in the course of a few years, have its orchard house. They will glisten on highland and lowland, and gladden many a garden-lover with their genial climate and varied produce.

In the present edition it will be seen that I recommend top-dressing to be done in the autumn, instead of in spring, as heretofore. I have found this to be by far the most eligible season; for, if done too late in spring, it is liable to make the trees shed their blossoms without setting fruit. With apricots, this is more particularly likely to occur. Potted trees, when top-dressed in autumn, commence at once to form fresh roots, which in spring are ready to fulfil their office in supporting the young fruit. Very recently, some cultivators have recommended trees to be shifted and re-potted annually: when they become large, this is a work of much trouble. I can say with confidence, there is no occasion to do this. My finest trees have now been seven years in the same pots; they bore last season large crops of very fine fruit, and are now full of promise, being covered with blossom-buds on short, well-ripened, healthy shoots.

THE ORCHARD HOUSE.

It was, I think, in the year 1849, that, being very fond of figs, I attempted to grow them in pots in one of my vineries; but finding they required more room than I could spare, I sought for some method by which I could overcome the difficulty. The pots I used, I ought to state, were not placed on benches, but on raised borders, for I had adopted the sunken paths and raised borders for many years, to avoid the expense of the usual benches of wood. The roots made their way through the aperture at the bottom of the pots, and the plants thus, even in comparatively small pots, obtained enough of vigor to support a crop of fruit. After the crop was gathered, the pots were gently turned up on one side, and the roots cut off with a knife, water was withheld, and the plants were soon at rest with well-ripened shoots. The following spring they were top-dressed with manure, and again placed on the border; but an idea occurred to me to give more room for the emission of roots by enlarging the aperture at the bottom of the pots: this I at once put in practice, with the most favorable results. I then reasoned, if figs in pots can be made to bear a crop of fruit by thus giving them extra nourishment during the summer, why should not peaches, nectarines, apricots, vines, plums, cherries, and pears, be managed in the same way? They can be; and I have now much pleasure in giving the simple method by which all these choice fruits can be grown on dwarf bushes in pots, with a certainty of a crop every season. I hope to see the day when hundreds and thousands of our small gardens will be furnished with cheap fruit-tree houses.

Glass, timber, and bricks, are now comparatively cheap; for sheet-glass that, when first brought into notice cost 2s. per foot, can now be bought at 2d. per foot; so we can build cheap houses, which, without the assistance of artificial heat, will give us, in average seasons, the climate of the south-west of France,—without the liability to injury from spring frosts, from which all temperate climates, both in Europe and America, at times suffer so severely. Let us now see how nearly glass structures without fire-heat will approximate to the climate of France in one of its most temperate districts,—viz., Angers.

The Chasselas de Fontainebleau grape, our Royal Muscadine, ripens there in the open air, in average seasons, on the 25th of August: this is as nearly as possible the time when it ripens here under glass without artificial heat. The black Hamburg grape ripens at Angers on the 25th of

September: in one of my vineries in a warm situation, I have had them fully ripe on the 15th without fire-heat. We can thus, at a little expense, in our own dear native land, reap the benefits of a warm climate, and enjoy its choice fruits, without suffering by a residence in its oppressive heat.

I may here mention that my idea of the approximation of the climate of the orchard house to that of the south-west of France is not imaginary, for some of my gardening friends from thence have said, on entering it, "Ah! Monsieur Rivers, voila notre climat!"

I believe that I have more than once described my "glass-roofed shed," for I have not ventured to give it too high-sounding a name; still, as it must come into extensive use, a better name may be found expressive of this peculiar structure, which is not a vinery, or pinery, or peach-house,—these all belong to great and grand gardens,—but a place for many fruits; it may, therefore, I think, without affectation, be called an Orchard House, a place requiring but little expense to erect, but little experience and attention to manage, and yet giving most agreeable results. To the suburban gardener, who has but a small garden, which must be a *multum in parvo*,—to the amateur with plenty of gardening taste and but a limited income,—in short, to a numerous class fully capable of enjoying horticultural pleasures, but with purses not bountifully supplied, the orchard house will, I feel assured, be a most agreeable boon. I will, therefore, proceed to give such directions as will, I trust, enable any carpenter to build one. There are two descriptions of houses calculated for this mode of fruit culture—the lean-to and the span-roofed. I shall commence with the former, which is perhaps the most simple and most common form of garden structures.

THE LEAN-TO ORCHARD HOUSE.

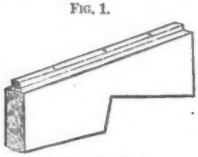
Its length may be from ten feet to one hundred or more, according to means and space; but its breadth and height should be according to the following dimensions, unless any improved plan may be suggested which will ensure greater advantages at the same cost.

I will suppose that an orchard house thirty feet long is required. A ground plan, thirty feet long and twelve feet six inches wide, should be marked out: then six posts of oak or good yellow deal, five inches by three, and nine feet six inches in length, or of larch poles sixteen inches in girth, cut in two and the flat sides placed outwards, must be firmly fixed two feet in the ground: the ground ends before fixing should be charred two feet six inches from the bottom, and then have a coat of boiling coal tar, which adds much to their durability. They will form the back line of posts, standing seven feet six inches in height from the surface of the ground. For the front wall six posts of the same thickness, four feet six inches long, must be firmly fixed eighteen inches in the ground, so that they stand three feet out.* Two posts will be required at each end; at one end (if only one door is wanted) these will form the door-posts. On these posts, both at front and back, must be nailed a plate four inches by three, on which the rafters are to rest; the posts are thus arranged in two lines. Now, then, for the rafters: these must be fourteen feet long. A nine-inch deal, *i. e.*, a deal nine inches wide and three inches thick, will make four, each four and a half inches by one and a half, or nearly so. These are light, strong, and

* These respective heights of front and back are a matter of choice: they may be exceeded; for I find that trees in pots make most vigorous growth.

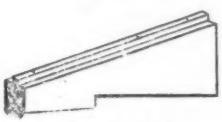
the most economical of all. Instead of "ploughing" the rebate for the glass, which is great labor and waste of material, on the upper side of each rafter, exactly in the centre, must be nailed a slip of half-inch board, half an inch wide; this will leave half an inch of the rafter on each side for the glass to rest on—not too much for glass twenty inches in width. The rafters are so far prepared for glazing, but not yet fitted on the plates at top and bottom of the projected house: no mortices must be made, but the rafter fitted to the back plate by cutting out a piece as in fig. 1, and to the front plate as in fig. 2. They must then be strongly nailed to the front

FIG. 1.



Top end of Rafter.

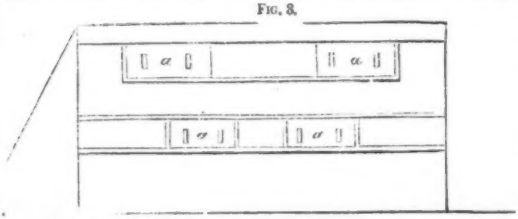
FIG. 2.



Bottom end of Rafter.

and back plates, leaving a space between each rebate of twenty inches. A piece of three-quarter-inch deal board, six inches wide, should be nailed along the top to the end of each rafter, so as to be even with their upper edges, and in this should be a groove to receive the upper ends of the pieces of glass. At the bottom a piece of board, one inch thick and six inches wide, must be let in, by sawing a piece out of each rafter for the glass to rest on and to carry off the water. We have thus formed a sloping roof seven feet nine inches (with the plate) high at back, and three feet three inches high in front. The glazing is now to be thought of. The most economical glass is sixteen-ounce British sheet glass, which can be bought at 2½*d.* and 3*d.* per foot, and the size to be preferred, twenty inches by twelve, placing it crosswise, as the rafters are twenty inches asunder. The laps should not exceed a quarter of an inch, and they need not be puttied, as the ventilation is more free when they are not. I find that scarcely any breakage takes place from frost, owing to the large pieces being elastic. On and outside the back posts, three-quarter-inch well-seasoned deal boards should be nailed. In the back wall thus formed, sliding shutters in grooves, three feet by one foot, must be fixed, to act as ventilators—two close to the roof and two about three feet from the surface of the ground, as in the annexed sketch; if two more be added to the right and left of the lower shutters, all the better: *in summer it is impossible to give too much air.*

FIG. 3.



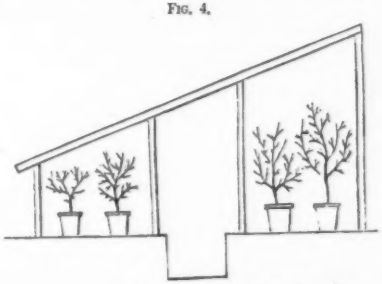
Back of Orchard House. *a, a, a, a,* Sliding Shutters in Grooves.

The front and ends (except the doorway) must have also three-quarter-inch boards, nailed on outside the posts; one of them, the upper one in the front, to be on hinges, so as to let down the whole length of the house: these, with the back shutters, when all open in hot weather, will ventilate thoroughly. To add to this, and it is all required in summer,

the boards will shrink and let in air: a fierce sunlight is thus admitted by the large glass, and abundance of air, in which all fruit trees thrive to admiration. The boards and rafters should be painted with stone-colored paint, which will give the house a very neat appearance. So much for the timber and glass; but when one sees that to walk along the centre of the building, which is about four feet nine inches in height, a person must be of very diminutive stature, the inquiry arises, how is head-room to be made? Simply by making a trench two feet six inches wide, and fifteen or eighteen inches deep in the centre of the ground plan: this will leave a border on each side four feet nine inches wide, and form a path at the same time. The front border need not be raised, as the trees in two or three years will require all the head-room they can have, but the back border should be raised about eighteen inches above the surface, supported by the brick or boarded edge to the path,—for the sides of the path must be supported with boards or four-inch brickwork. It will be found a great improvement (for which I am indebted to a friend) to divide the back border into two terraces, by raising the back half twelve or fourteen inches, building a four-inch brick wall, and filling in with earth, so that the back row of trees is elevated, and thus escapes any shade given by the front row; the effect also is very good. Now, as every thing depends on these borders—for there must be no benches and no shelves—care must be taken to make their surface loose and open: loose materials, such as lime rubbish from old walls, and road sand, mixed with manure, may be laid on them, about four inches deep; they may then be forked over to about nine inches in depth, well mixing the above materials with the soil: you thus have two borders not too far from the glass, and *on* which your orchard will thrive admirably. It will appear odd to read about trees thriving *on* instead of *in* a border; but when I explain that this is to be an orchard in pots, it will not seem so contrary to our usual garden culture.

It will be seen, I think, by the description I have given, that the lean-to orchard house is merely a low greenhouse, with its roof sloping to the south or south-west, such as may be seen in many of our small villa gardens;

Fig. 4.



Section of a Lean-to Orchard House.

only, instead of having a path in the centre and a bench on each side for the flower-pots to stand on, it has a sunken path and a border of earth on each side, on which fruit trees in pots are to be placed. The foregoing rough section will perhaps convey an idea of this structure and its use.

BUILDER'S ESTIMATE.

By Mr. Burton, Builder, Sawbridgeworth, given in 1857.

To ———. *An Estimate for erecting an Orchard House, 30 feet 6 inches long, 12 feet 6 inches wide, 3 feet 3 inches high in front, and 7 feet 9 inches at back.*

3 feet oak door sill, 4 by 3.
64 feet of fir for plates.
84 feet ditto for end rafters and door posts, &c., 3½ by 2½.
309 feet ditto for middle rafters and sill, 4½ by 1½.
110 feet ditto for posts, 5 by 3.
30 feet deal for top and bottom rails, 9 by 1¼.
560 feet (super.) ditto for boarding fillets, &c.
90 feet (super.) fir for sides of path, piles, latch, joints, and buttons.
Painting with anti-corrosion paint, 2 coats.
187 squares, 16 ounce sheet-glass, putty, and labor.

£28 5 0*

By using larch poles instead of squared timber for the posts, a saving may be effected; by being one's own carpenter, a larger saving. By using oak for posts, unless small oak trees can be bought cheaply, £1 15*s.* must be added to the above estimate.

The foregoing estimate and sketch are for a Lean-to Orchard House standing by itself: where there is a brick or other wall to serve as a back wall, it may be built against it, with a great saving in expense; but as sliding shutters cannot conveniently be let into such walls, ventilators may

* The following estimates of the cost of similar houses in America have been kindly furnished us by Richard Morris Smith, architect, of Philadelphia.—Ed.

AMERICAN ESTIMATES.

Fig. 4. Lean-to, or single-pitch Orchard House:

570 feet of hemlock scantling at 1¼c.	$7 12
680 " poplar for boarding, &c., at 2c.	13 60
450 feet, 15 by 20 glass, (per 50 feet), $1 95	17 55
Labor, putty, &c., &c.	32 00
Complete, without wash or paint,	$70 27

Boards to be milled but not hand-planed, and finished in two coats stone-wash if desired,—but the cost of stone-washing not included in the estimate. From $27 to $33 should be added, if the work is hand-finished for paint. About $15 should be deducted if it is built against a stable or other wall.

Fig. 5. Small span, or double-pitch Orchard House:

456 feet of scantling, (hemlock), at 1¼c.	$5 70
544 " poplar, at 2c.	10 88
550 " glass, (per 50 feet), $1 95	21 45
Labor, &c., &c.	31 00
	$69 03

$25 to $32 should be added, for hand-finish and painting.

Figs. 6, 7. Large span, or double-pitch Orchard House:

Finished in the first manner as above described, about	$120 00
Paint-finished	160 00

be made at the top of the slope of the roof, by having every alternate square fixed in a wooden frame, with a hinge at top and a flat piece of iron with holes in it suspended to the bottom corner: an iron peg should be placed in the rafter to fit into the holes; with this, the ventilators can be raised or sunk at pleasure.

The most complete house of this kind, built against an old garden wall, with a S. W. aspect, is in this neighborhood. The wall is 12 feet high, and covered with full grown peach and nectarine trees; the house is 200 feet long and 15 feet wide, 4 feet 6 inches high in front, with front sashes 5 feet by 3, on pivots, so as to ventilate thoroughly; the rafters are 4½ by 1½ inches, and fixed 20 inches apart; glass, 20 inches by 15, and every alternate square at the top next the wall is framed, and on hinges opening upwards (these should be arranged so as to open all at once with a line and pulley); the path in the centre is 3 feet wide, and on each side, 3 feet from the path, is a row of espalier peaches and nectarines; between the front row and the glass are bushes in pots, so that in one house are three modes of culture. It is also divided into three seasons by partitions of glass, forming three compartments; two of these are fitted with hot water pipes, and one left without, as in a common orchard house. In one house forcing is commenced early, so as to have ripe peaches or other fruit in May; the second succeeds it with peaches in June and July; and the third, without heat, gives its crop in August, September, and October: peaches and nectarines are thus in perfection from the middle or end of May till the end of October. The fruit on the wall is the first to ripen, and is very early, owing to the warm aspect. This is the most complete lean-to orchard house I have ever seen; and although 15 feet wide, it can be built at a less cost than the narrow upright houses in front of the walls at Trentham, which are only 5 feet in width.

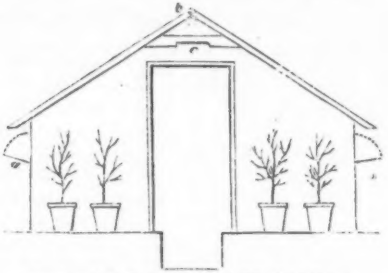
The lean-to house, whether against a wall or standing alone with its boards for walls, forms a most excellent vinery for grapes not requiring fire-heat, such as the Black Hamburg, and the Sweetwater, and Muscadine grapes. The vines should be planted inside the front wall, and 2 feet apart, trained under the rafters, 14 inches from the glass, and managed on the spur system, which is the same as that given for the training of grapes in pots. In the south of England, the sorts above named will never fail to ripen in this kind of vinery. So much do they love free air, that I have for some years opened my ventilators in the middle of July, and have never closed them till the end of September. My grapes have invariably been of the finest quality.

I now propose to give a sketch and description of a Span-roofed House, a little wider and cheaper. A house of this form is more agreeable as a promenade, and I think the trees are attended to with more facility. But unless placed in a warm sheltered garden, peaches and nectarines do not ripen quite so early in it as in a lean-to house. I think, however, it has a more agreeable look, and I must confess a preference to it. The following is a section of what I shall call the Small Span-roofed Orchard House. Height at sides, 4 feet; at centre to ridge, 8 feet; width, 14 feet; rafters, 8 feet in length, 3 inches by 1½, placed 20 inches apart; posts of oak, 5 inches by 3*, 5 feet apart; plates, 3 inches by 2; central path, 2 feet 6

* Oak posts of this size, I find on referring to the wooden tombs in the churchyard, last from 50 to 60 years.

SMALL SPAN-ROOFED ORCHARD HOUSE.

Fig. 5.



Section of the Small Span-roofed Orchard House.

a, *a*. Shutters on hinges, 12 inches wide, one on each side. The upper edges should be 1 foot from the eaves.
b. Ridge board.
c. Shutter over the door.

inches wide. The borders in this description of house need not be raised, but the path may be sunk 2 or 3 inches, and each side sloped so as not to crumble into it; the expense of a brick edging is thus saved. The borders should have a dressing of manure and sand, or manure and burnt earth,—in short, of any lose materials,—and be well forked over and mixed to 6 or 9 inches in depth.

Two rows of trees may be placed on each border, thus—

3 feet from stem to stem, so that the sun may shine on every leaf. This is most essential; for I have occasionally had some of my peaches deficient in flavor, and on examination have always found the trees too much crowded, so as to shade each other. In these small span-roofed houses, the trees placed as above form a charming avenue, and are looked down upon by the cultivator, so that every leaf and fruit is seen. It will add some trifle to the expense of building, if the sides, 1 foot or 18 inches from the eaves, are of glass, the wooden ventilating shutter being beneath the glazed part. The doors and ends may be partially glazed: the extra expense is fully repaid by the light and agreeable appearance given by this mode of building.

The cost of a plain-boarded house, as given me recently by Mr. Rivett, Builder, Stratford, Essex, is as follows:—

A span-roofed orchard house, 30 feet long, 14 feet wide; sides, 4 feet, middle to ridge, 8 feet high; oak posts, 5 inches by 3; close boarded, glazed with 16-ounce glass, painted twice with anti-corrosion paint: complete, £27 10*s*.

The small span-roofed house will be found an agreeable and economic structure; but, as large gardens require large houses, I am induced to recommend for them the following, which I shall term the

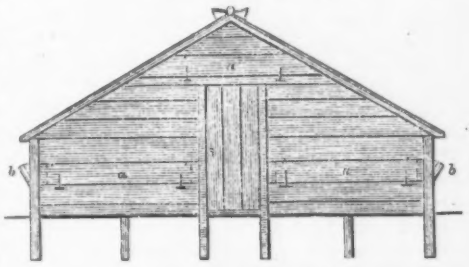
LARGE SPAN-ROOFED ORCHARD HOUSE.

My large houses are twenty feet wide, the sides four and a half feet high, and nine and a half feet in height to the ridge; the paths are two and a half feet wide; the brick beds at the sides are four feet wide and fifteen inches high, the central bed seven feet wide and eighteen inches high. These dimensions may of course be varied at the pleasure of the builder; I give mine exactly as they are. The posts to support the side plates are of oak, six inches by four; they are two and a half feet in the ground, and placed four feet apart; on these are nailed deal boards three-quarters of an inch thick, the upper one of which, on each side, one foot in width, is on hinges to form the shutters for ventilation; the rafters are four and a half inches by one and a half, and placed twenty inches asunder. (In large span-roofed orchard houses used for forcing fruit, and in which artificial heat is employed, one or two shutters on hinges at the apex of the roof are necessary to let off the heated air in sunny weather; but I find them quite unnecessary in houses without fire-heat). This is the most economical method of building large span-roofed orchard houses; but they may be varied, and iron, and brick, and glass, employed at pleasure. One recently built at Audley End is, I think, worthy of a short description: its sides are brick walls, two feet six inches high; on these, sashes two feet six inches by three feet, are fixed with pivots, so as to admit a large quantity of air; width twenty feet, length ninety feet, height ten feet; the roof is supported by a row of two-inch iron pillars along the centre, about seven feet apart; the central and side beds are twenty inches high, the paths three feet wide. This is really a noble as well as a nobleman's orchard house, and forms a healthy and most agreeable promenade. In all orchard houses where expense is not heeded, the water should be conducted from the roof into a tank or tanks underground, either outside or inside. Rain water is the best of all to syringe or to water the trees with.

The following is the estimate recently given me by Mr. Rivett for a large span-roofed orchard house, built in the plain manner, as given in figs. 6 and 7:—

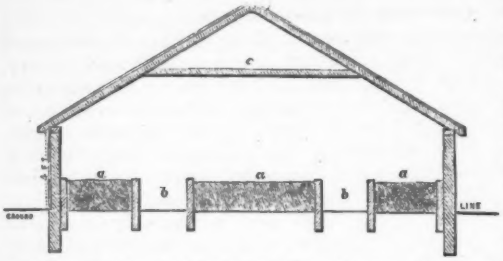
"An orchard house thirty feet long, twenty feet wide; sides, five feet high; middle, ten feet to ridge; with iron pillars to support roof; oak posts, close boarded, glazed with sixteen-ounce glass, painted twice with anti-corrosion paint, £45. The raised brick borders generally built in houses of this size, are

FIG. 6 (*End Elevation.*)



a. Shutters, 1 foot wide, on hinges at ends.
b. Do. do. on each side.

FIG. 7 (*20-feet Section*).



a. Beds (supported by 4-inch brick walls, built with cement) filled up with compost.
b. Paths, 2½ feet wide.
c. Collar beam. These collar beams should be 6 feet apart: iron pillars, which may be formed with 2-inch gas pipes, in a row along the centre, support the roof equally well, and have a lighter and better effect: they should also be 6 feet apart.*

not included in the estimate." I may add that raised borders may be dispensed with if half-standard trees are cultivated, with stems from 2½ to 3½ feet high. The tallest trees should occupy the centre of the house: this kind of house, furnished with nicely-pruned round-headed trees, with straight stems, would have a very orchard-like look, and they would be very productive.

It is essential that these large houses should stand endwise N. E. and S. W., or nearly so; for if placed N. W. and S. E., as mine are, owing to the peculiarity of the site, the trees in the north-east border are too much shaded, and do not ripen their fruit well. I also prefer the same position for small span-roofed houses. The height of the above exceeds that which I have described in p. 16, but I am inclined to think it more eligible, for it is surprising to see what fine and even large trees can be grown in pots.

A very good gardener has asserted that peaches and nectarines from bushes are inferior in flavor to those grown on trellises in peach houses; and that he could produce more fruit in the same space by the latter mode. I can easily imagine a partial failure in flavor; not owing, however, to the system, but to the management. The trees alluded to have not had room or air enough; and, consequently, the fruit has not been high flavored. I have had Noblesse and other peaches from bushes in a pot standing in the full sunshine in one of my houses of the most delicious flavor, while those from trees partially shaded were not good. The peach-house trellis system is not adapted for small gardens; one, or at most two trees, will cover the roof of a house 20 feet by 12; and nothing can be grown under them. Besides this, three or four years must elapse before they commence to bear to any extent; and, above all, it will require a good gardener to train and prune them, for no amateur could bear the fatigue of constantly keeping his eyes to the sun.

Since the foregoing pages were written, "crystal palaces" have been built. I have written for more humble gardens; but large orchard houses may be built on the ridge and furrow system: still it will require caution, for I am inclined to think that a ridge and furrow house of great width can never be ventilated sufficiently to give flavor to fruit. One of these "palaces" with raised borders, well furnished with peaches, nectarines, apricots, figs, and even pomegranates, in 20-inch pots, and treated as recommended for all other orchard-house trees, would realize an Eastern garden, and bring

* A lighter and equally eligible mode of supporting the roof is by iron rods (2 inches in circumference) in lieu of collar beams; these must be supported by perpendicular rods, hooked on to the centre and fastened to the ridge board by screws.

to mind one of the fruit gardens of Damascus, so vividly described by travellers. In short, I know of nothing in gardening more capable of fully gratifying the two senses—sight and taste. Thus in great and grand places, in lieu of a cheap and simple orchard house, a fruit conservatory, heated by hot-water pipes, may be built, and the trees grown in ornamental vases placed on elevated beds. A few tea-scented and other delicate roses, and spring-flowering bulbs, planted in the borders, would make them gay, and have a pretty effect. It must, however, be recollected, that but very few of what are called conservatory plants can be planted in a common orchard house; for it is necessary that it should be cold and dry in winter to give the fruit trees their rest. If fire-heat is used, it must only be applied early in spring—towards the end of February—to force the fruit, if early fruit be required, and not in winter, as in greenhouses, to keep out the frost. I have, however, reason to believe that orange trees and camellias may be planted in the borders with a good chance of success: they should have no water after the middle of October, and about the middle of December some sticks should be stuck in the ground round each tree, and the space between the sticks and the tree filled up with dry hay, and a mat or light woollen cloth (Frigi Domo would answer well) wrapped round the sticks. The mat or outer cover should be taken off by the end of January, leaving the hay, and replaced if severe frost comes on. It would insure success with oranges and camellias planted in the borders, if the house could be gently heated in severe weather, so as to prevent the temperature falling below 26°; this would not stimulate the fruit trees to any extent, and yet would, to a certainty, preserve camellia and orange trees. The most severe frost will not injure tea-scented roses or bulbs, if the house be kept perfectly dry after October.

It is very possible that some who read this may say, "Why not plant the trees in the raised beds, rather than in pots or vases?" To this I reply, They cannot be kept under control, unless they are annually lifted and replanted early in November. I had some peach trees which were planted in the raised borders of one of my orchard houses: they bore well; but, in spite of root-pruning, they would grow too rapidly. Now, in pots, the size and growth of the tree may be regulated with the greatest nicety; the annual root-pruning can be done with much facility, and there is no occasion to dig and disturb the borders, which must be done to a great extent to thoroughly root-prune trees planted in them. Indeed, as far as my experience has gone, I can honestly recommend pots, vases, or boxes, for fruit trees in orchard houses or fruit conservatories. In the "Gardeners' Magazine," vol. ii., page 278, peach trees are mentioned as having been in pots twenty years without being repotted: they had been kept in health and fruitfulness only by top-dressing.

I am, however, inclined to think that peach and nectarine trees, planted as pyramids and bushes in orchard houses, would give great satisfaction to the "poor gentleman" who is his own gardener, for it is only such that can and will fully enter into any new mode of gardening. Peaches, nectarines, and apricots thus cultivated should be lifted and replanted, with a little rich compost, annually, the last week in October: they should each have, when replanted, four or five gallons of water, and the same quantity about a week after: no more should be given during the winter.

Size of Pots.—In potting trees for this description of culture, pots of

different sizes may be used, according to the taste of the cultivator. If large trees for large houses are required, 15-inch pots (15 inches in diameter and 15 inches deep) will be necessary; for moderate-sized trees, 13-inch pots: this on the whole is the most eligible size. For smaller compact bushes, 11-inch pots are convenient, as they are not unwieldy, and the trees may be made ornaments of the side-board in the dining-room; and beautiful objects they are when full of fruit. Miniature, yet fruitful, peach and nectarine trees may be grown in very small pots, for I have some not more than 9 inches high, in 8-inch pots, full of blossom-buds. Trees of this size must not be allowed to bear more than four or five fruit. They are most interesting, and I have no doubt will, ere long, be extensively cultivated by the curious. These very small fruitful trees are grafted, which seems to make them precociously fruitful: peaches and nectarines are generally budded.

In remote places, where large pots are difficult to be procured, tubs like those used for orange trees, or more properly boxes, may be employed with success, and for trees of large size, *i. e.*, when they are from ten to fifteen years old, they will probably be absolutely necessary. They are easily made: boards, one inch thick, either of oak or deal, should be firmly nailed together so as to form a box fifteen inches deep and twenty to twenty-four inches square; the bottom should be formed with bars one inch thick, placed about half an inch asunder, to allow the roots to penetrate into the borders.

Apricots.—Apricots in pots are very rarely seen, even in large establishments; they are difficult to force, as they will not bear the confined air of a forcing house. I remember, some years since, being much struck with some apricots cultivated as dwarf trees in the South of France: the trees, full of their golden fruit, looked so beautiful,—at the time I wished that our climate would allow us to grow them in the same way. I did not then think of cheap glass, root-pruning, and pot culture.

It must always be borne in mind that, without abundance of air and the full light of an unshaded roof,—by this I mean that no vines must be trained under the glass,—fruit of high flavor cannot be grown; the trees will bear well, but their fruit will be vapid and flavorless.

The best trees for pot culture are those that have been in pots one or two years: if these can be purchased, so much the better. The next best are trees that have been removed and cut down one year in the nursery. If neither of the above can be found, "dwarf maiden trees"* will do. Trees taken from the open ground must not be potted till the end of October. Presuming that potted trees have been procured, they may, early in October,—if omitted then, in November or December,—be repotted into pots of the size selected for this system. I have named 11-inch pots, because they are portable, and the trees may then be shifted into large pots as they advance in growth; 11-inch pots will, at any rate, do well to commence with. October, November, and December, are the best months for potting trees; they may indeed be potted till March, but then no fruit must be expected the first season. If fruit-bearing trees that have been grown in pots can be procured, they cannot be potted too early in October.

I know of no compost better for stone-fruits than two-thirds turfy loam and one-third decomposed manure, to which some road or pit sand may be added. The loam should not be sifted; if it contains a large proportion of

* This is a term applied by nurserymen to trees one year old from the bud or graft.

lumps as big as an egg, so much the better. If you examine an 11-inch pot, you will find it eight inches across at the bottom, and the aperture from one inch to one and a half in diameter. Take a light hammer, and enlarge this aperture to five inches in diameter*; then place four or five large pieces of broken pots or tiles across, so that they rest on the inside ledge left by the hammer, leaving interstices for the free emission of roots: on these place some of the most lumpy part of your compost; then your tree, not too deeply, but so that the upper part of its roots is a little below the rim of the pot: if it has a ball of earth, loosen it; fill up with compost; ram the earth down firmly, as you fill, with a stout blunt-pointed stick; place it on the border where it is to grow during the summer; give it two or three gallons of water, and a top-dressing of some manure to lie loosely on the surface, and the operation is finished.

We will suppose that our tree, a nice dwarf bush, with five, six, or seven branches,† is potted. It may rest till February, and then be pruned,—a pleasant, simple operation, more easy to show than to tell how to perform. I may as well now state that the pruning recommended here for apricots will serve for all bush fruit trees under orchard house culture, except peaches, nectarines, and figs. Each branch must be shortened with a sharp knife to ten inches: these shortened branches will form the foundation of a nice regularly-shaped bush. In May each branch will put forth three or four shoots: all of these but the topmost one must be pinched off to within about two inches of their bases: they will form fruit-bearing spurs; these will continue all through the summer to make fresh shoots, which must always be pinched off to a length of two inches. By the end of the first season the leading shoots of the tree will be probably three feet in length, and, as well as the spurs, be furnished with blossom-buds. The summer is past; the month of October is with us. Its shoots are ripe, and the tree has ceased to grow: it must be put to rest for the winter, by lifting up the pot and cutting off closely every root that has made its way into the border: it is then ready for its top-dressing, the method of giving which I have described further on.

The second season:—in February, or early in March, the leading shoot made the preceding year, and which ought to be from two to three feet long, must be shortened to ten inches, and the young shoots as they push forth in summer (all but the leader) be pinched off as in the first season. The third season:—as the tree will have increased in size, its leading shoots may be shortened to six inches, and as it becomes aged and fruitful, annually to four inches, and at last pinched off in summer to two inches, as to make a compact round bush. In the course of time some of the shoots in the centre of the tree will require thinning out with the knife, if at all crowded.

The general management of the trees the second year should be as follows:—

February is with us, and, if the season be mild, buds are beginning to swell, and flowers to bloom: the trees in your orchard house are, however, dry, dusty, and stagnant; place them in their stations, three feet stem from

* I now have my pots made with five holes, each an inch and a half in diameter. In remote places, where these cannot be procured, the enlarged holes may be used.

† If a tree with only three or four branches is potted, they must be cut into four inches; and the tree must have a season's growth to form itself.

stem, give each of them a small quantity, say a pint, of water,—not, however, if the winter is still raging,—let them rest three days, then give them a quart each—in short, gradually saturate the earth in the pots, and afterwards water them regularly according to the state of the weather. The buds, if the weather is mild, will soon begin to swell, and in March, or early in April if the season be late, they will put forth their full bloom; and beautiful things they are, for no frost, no storms, will destroy the blossoms. If the weather be sunny, with sharp frosts at night, as is often the case in early spring, the shutters, both back and front, may be open all day and closed at night; if a wind-frost and cloudy weather, they may be closed day and night; the ventilation through the joints of the boards will then be amply sufficient. With this treatment nearly every blossom will set. As soon as the fruit becomes the size of a horse-bean, commence syringing the trees morning and evening with soft water, and continue to do this all through the summer till the fruit begins to change color before ripening. Weak liquid manure may be given once a week during the summer. This is, however, almost a matter of choice. My trees grow and bear well without it. Guano water, one pound to twenty gallons, is perhaps as good as any; and a good soaking of this once a week is better than using it more frequently. While in their young state, the fruit must be thinned, leaving, at first, upon a bush that has been two years in a pot, about three dozen; which, when they attain the size of a small nutmeg, must be reduced to two dozen: the third year, a tree, if it has prospered, will be able to bring three dozen to maturity; it is, however, better to have a few finely-grown fruit than many that are small. If some of the trees are required to decorate the dessert—and what can be more ornamental than an apricot tree full of fruit?—they must be prepared for removal by lifting the pots a week previously, so as to break off the roots that have struck into the border: no harm will be done,—it only checks their growth a little prematurely; they must, however, in such cases, be brought back to the orchard house after the fruit is gathered, and have water till the end of October.

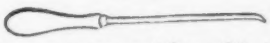
To sustain trees in health in pots something more must be done than allowing their roots to go into the border; annually, in October, every tree should have a top-dressing of rich compost. I have employed, with much success, horse-droppings gathered from the roads, and unctuous loam, equal parts. The former I have had saturated with night-soil or liquid manure, and then exposed to the air for two or three months before mixing it with the loam. Some powdered charcoal strewed over this compost will prevent any disagreeable smell. Any kind of rotten manure, however, and loam, seems to answer well for top-dressing, which is done in the following manner: take out a portion of the soil, five or six inches in depth, and about four inches in width all around the side of the pot, leaving the central mass of roots undisturbed (a portion of the mould may, however, be picked out from among the mass of fibres with advantage, as fresh food can do them no harm); then fill in the compost, and ram it firmly down; keep on filling and ramming till it is on a level with the edge of the pot; place one or two inches of loose compost on the surface, as it will settle much during the winter; give one or two good soakings of water; and then place the trees close together, for you will then have more space for winter parsley, lettuces, young cauliflowers, and other matters requiring shelter. Water

must be withheld, and the trees suffered to remain dry and completely at rest during the winter.

This treatment may be continued every year without variation, except as regards pruning. In removing the trees to their allotted places on the borders in spring, I have lately found it beneficial to take out about two shovelfuls of earth on the place where the pot is to stand, and replace it with the same quantity of the compost used for top-dressing: the tree is thus fed from above and below. It will be necessary in very dry winters to watch the trees to see if their shoots shrivel; if so, they must have a small quantity of water, but not in severe frost; and if the winter be excessively severe, to "make assurance doubly sure," some dry hay or litter may be laid on and around the pots: the dry state of the soil will, however, as far as my experience has gone, perfectly resist the effects of frost.

The best implement for top-dressing is a piece of iron rod an inch and a half in circumference and nine inches long, flattened at the end, with a handle of wood five inches long, like the annexed figure.

Fig. 8.



Now, let us see what we may expect from this treatment. The apricot, the peach, and nectarine, as is well known, all come from the East. We will take Persia or Armenia. The winter there is dry and very severe; the spring dry, with hot sun and piercing wind, just when peaches and apricots are in full bloom, and yet how they succeed! Let any one go into an orchard house when we have our usual March weather: the wind will whistle through it, and the climate will be dry, sunny, and bracing; the blossoms, under these circumstances, will all set. Unfortunately, we cannot command sunshine enough to carry us along, to make our fruit ripen in May and June, as in warmer climates; we must, therefore, wait patiently, for our orchard house climate is slow but sure in its operations. If the above directions are followed, Eastern nature is imitated as closely as our cloudy skies permit. The trees bloom in a dry, airy place; they pass through a comparatively dry, warm summer; they are, like all trees natives of dry climates, early in a state of perfect rest, which is continued all through the winter, and thus they form healthy shoots and well-developed blossom-buds. Nothing in culture can be more perfect, and all is so simple, that, knowing as I do, with what facility it is done, I feel ashamed of the many words I have used in describing it.

It will be seen that I have, to carry out this system, recommended houses of wood and glass; those, however, who prefer brick to wooden walls, may have them, as any greenhouse may be made into an orchard house, by merely lowering the roof to the height given in page 10*, sinking the pathway, and having sliding shutters, back and front. The grand essentials are, low roof, borders instead of benches, and constant ventilation, more or less, according to the state of the weather, through the shutters; but in houses with brick walls there will not be that constant, gentle percolation of air which there is through boarded houses, and which seems so highly favorable to the well-being of stone-fruits.

* It must always be borne in mind, that a low roof, so that the trees are not too far from the glass, is most essential. My trees, seven years old, nearly touch it,—the nearer the glass the finer the fruit.

I have, I find, omitted to state the number of trees that may be grown in a given space. The trees should be placed in the borders, back and front, three feet apart, stem from stem. A house of the dimensions given in p. 15 will thus hold from twenty-five to thirty trees. Thirty trees will give sixty dozen and upwards of fruit, when in full bearing. A small bush of the Pitmaston orange-nectarine, four years old, produced, one season, four dozen of fruit, and brought them all to perfection; still this is too many, as some of the fruit were small. I mention this merely to show what can and may be done in this very interesting mode of cultivation, which, to sum up, is as follows: annual top-dressing, annual summer pruning by pinching, autumnal or spring pruning, and root-pruning.

There are, I well know, some amateur as well as professional gardeners who object to the pot culture of apricots; to such I can with confidence recommend planting of apricot trees in the borders, and lifting and replanting them biennially, about the end of October, with a few shovelfuls of the potting compost: they soon form compact and most fruitful bushes: I have some trees under this treatment remarkable for their healthy and sturdy growth.

The season of that very fine sort, the Peach-Apricot, may be prolonged to a great extent; it generally ripens in the orchard house about the first week in August, but by the following simple method it may be had in perfection till the middle of October. The end of June some trees full of fruit should be selected, and those that are to be very late should be placed under a north wall till the first week in September, and then removed to the orchard house to ripen their fruit. Those that are to ripen in September should be placed in a sunny, exposed place, till the end of August, and then be removed to the orchard house. The fruit from those trees that are much retarded will not always prove good, unless the weather be fine and warm; but that from trees set out of doors in a sunny place and then ripened in the house will be most excellent.

Half-standard apricots may be made charming ornamental trees for the summer decoration of the flower garden; for this purpose trees with nice straight stems about three feet in height should be selected, and planted in pots or tubs. They should be grown in the orchard house, and about the middle of July be removed to the lawn or any part of the garden where such trees would be desirable. They can be pruned into round heads and employed for summer ornaments, just as orange trees are in many gardens: they will be found equally ornamental and more useful, because their fruit is valuable.

The most desirable sorts of apricots for pot culture are: the Red Masculine, which ripens in June; the Large Early in July; St. Ambroise, which follows very closely; the Kaisha; the Blenheim; the Royal; and the Peach-Apricot, like the Moor Park, but larger and a better bearer. These are placed as nearly as possible in the order of their ripening, and give a good succession.

They will come in nearly at the same season as those on walls; for it must be understood that fruits in thoroughly ventilated orchard houses are not much forwarded unless the season happens to be very sunny. It is not an *early* but a *certain* crop that must be expected. I have not named any later kind than the Peach-Apricot because it is so easily retarded, and is always of the highest excellence; it is also the most abundant bearer of all.

Fig. 9.

An Elruge Nectarine Tree, three years old, from a Daguerreotype.

Peaches and Nectarines. Few fruit trees give more satisfaction in the orchard house than a choice selection of peaches and nectarines: when in blossom, in early spring, the trees are so fresh and beautiful; they are so exceedingly prolific; and in autumn, what fruit can vie in beauty with a ripe peach or nectarine? and what to the lover of fruit trees can be more gratifying than to see his sideboard or dining-table decorated with peach-bushes in pots, studded with their lovely and perfectly ripened fruit?

If bushes of only a moderate size are required, 11-inch pots, as recommended for apricots, may be used. It is surprising to see what vigorous growth, and what fine fruit, peach trees in 11-inch pots give; for, owing to the compost being rammed down, a large quantity of nutriment is given in a small space. I may as well, however, state, once for all, and for all descriptions of fruits, that, if fewer and larger trees are required, larger pots may be employed; thus 13, 15, or 18-inch pots may be used with equal success, by having numerous apertures at the bottom, allowing the emission of roots during the summer, root-pruning, and putting the tree to rest during the winter. A peach or nectarine tree may thus, in two or three years, be made capable of bearing many dozens of fruit; but I must confess that my taste inclines to small prolific trees only because one can have greater variety in a small space; and small trees are pretty, are easily looked over, so that each leaf and bud, each blossom and fruit is known.

If peach trees, already in pots, and in a bearing state, can be purchased, so much the better, for then a year is saved; but as such are more expensive than either "maiden" or "cut-down" trees, the cost of which is generally about 1*s.* 6*d.* to 2*s.* 6*d.* each, these had better be purchased. I may here state that "cut-down" trees are two years old, and if nice healthy trees of this description, with fully ripened shoots, can be found, they are better than "maiden" trees. But as they are not often to be met with,

I will first give the treatment required by one-year-old, or "maiden" trees.

These have one shoot, more or less vigorous, which should be well furnished with buds towards its base. This shoot must be cut clean off with a sharp knife, at the seventh bud from its base, and the tree then potted in the same compost recommended for apricots, in the same sized pots, and at the same season, being towards the end of October, or early in November.* The following summer every bud will, or ought to, produce a shoot. If there are seven shoots, the tree is formed for the season: they need not have their tops pinched off, but will merely require the laterals (small side shoots) pinched off to within two buds of their bases as soon as they are four inches long. This will induce the ripening of the shoots, so that by the end of the summer they will be full of blossom buds. At the end of August the point of each shoot should be pinched off, and they will then only require the annual pruning, either in autumn or spring, for which directions are given below. If the tree puts forth a fewer number of shoots than seven, the tops of all should be pinched off early in June; each shoot will then put forth three or more young shoots; all that are not required to form the tree must be pinched off in the same way as laterals, leaving seven, or, if the tree be vigorous, nine shoots to each tree. These trifling manipulations are easy to do, but difficult to describe: so to make the matter as clear as possible, let us place a young tree before us early in June, with five branches, each twelve inches in length; then let us, with a sharp penknife, shorten each branch to nine inches; then, at the end of June, let us take the same tree in hand, and we shall find that each shortened branch has put forth two or three young shoots; we must pinch them so as to leave on four branches two, and on one only one, making nine shoots, which as they grow should have their laterals pinched off regularly; they will then make vigorous trees in one summer, and form abundance of blossom-buds: no other pruning is necessary the first season; and if abundant ventilation and syringing daily, as recommended for apricots, have been attended to, the fruit buds will, towards the end of August, begin to be fully developed. The experienced gardener can at once distinguish them: such a person may prune his trees early in October. Let me endeavor to tell how to distinguish a fruit-bud, which, by the way, is the only bud to prune down to.

Well, then, generally, or "general always," as a foreign friend expresses it, when he wishes to say anything that invariably takes place, towards the base of each of your seven or nine shoots, you will find four or five pointed single buds, covered with their brown coat; these are leaf-buds; next to these, and higher up the shoots, are triple buds, a plump silver-coated one on each side, and a thin one in the centre. These plump silvery buds are blossom-buds, and the central one a leaf-bud, which produces a shoot, so necessary to the well-being of the blossom-buds, that without it they would be abortive. Be sure to have on each shoot, if possible, nine to twelve of these triple buds, and cut off the shoot close to one of them; if this cannot be found at the proper place, so as to be able to form the foundation of a nice, regularly-shaped, bush-like tree, cut off the shoot at a leaf-bud. If the trees are pruned in autumn, the buds are difficult to distinguish; it

* This season is recommended, but it may be departed from; for my peaches and nectarines are sometimes not potted till March, yet they make fine growth.

will, therefore, be better for the beginner not to prune his peach and nectarine trees till February or early in March, when every bud will plainly show its character,—the blossom-buds by that time will have opened their silvery coat, and the bright pink will be peeping out. If the shoot be cut off at a single blossom-bud, it will die down to the next leaf-bud; this must therefore be carefully avoided.

Let us now proceed with the culture of our maiden tree. A season has passed: it is early spring, say the middle of February, and our tree, with its nine branches of the last summer's growth, is before us; three of these should be cut down to within five buds of their bases, to give a supply of young shoots for the succeeding year, and six should be cut down so as to leave on each branch ten or twelve triple buds. These are the fruit-bearing branches for the present season: and so it must be every year; a few branches, say one-third, must be cut in closely on opposite sides of the tree to give young shoots, and the remainder left as above to bear fruit. Those shoots that have borne fruit will often require to be cut out, to make the tree dwarf and prevent its becoming naked, as the spurs die after bearing, unlike those of the apricot and plum, which continue to bear fruit for many years. Much will depend upon the sort cultivated, and the vigor of the tree: one thing must be borne in mind,—do not let the tree become bare of young shoots towards its base, and tall and straggling. If pruned in spring, the nature of every bud may be seen, and the tree formed, by the proper use of the knife, into a fruitful, beautiful bush.* From twelve to fifteen leading shoots should be left in summer pruning on each tree when in a full-bearing state.

I have thus endeavored to follow the "maiden" tree to its fruiting state. The "cut-down" tree, which should have four or five branches, should be potted in autumn and pruned in early spring: each branch must be shortened to six inches; these will put forth numerous young shoots, which in June should be thinned out with a sharp knife, leaving nine or more shoots to be pruned the following spring, as above directed. If trees in pots three or four years old in bearing state can be purchased, it is a saving of time, for if they are potted before Christmas, a crop of fruit may be expected the ensuing summer; in such trees, the shoots intended to bear fruit, and covered with triple blossom-buds, may be shortened to ten buds, and those which are to make young shoots for the next year's bearing should be shortened to five buds.

I think I may now add with safety, having (this day, February 14, 1856) just pruned my trees for the sixth year, that but little anxiety need be felt by the beginner, for when a peach tree has been in a pot in an orchard house for two years it *will* bear, prune it how you will. All that seems to be required is to make the tree symmetrical and prevent its bearing too bountifully, for it must be borne in mind that fruit from a tree overloaded, whether under glass or in the open air, is never of a fine flavor. Peaches, pears, plums, apples, and indeed all descriptions of fruit, suffer in flavor to an extent scarcely thought of, if the tree be suffered to bear too many. It is better to have one dozen of peaches large and of fine flavor, than two dozen small

* When the trees are in a bearing state, many short, spur-like shoots, from four to six inches long, will be made every season on the stem and towards the base of the principal branches. These will be generally covered with single blossom-buds and a terminal leaf-bud: they may be removed if too much crowded, *but never shortened.*

and inferior; besides this, a tree suffered to bear too large a crop will be sure to fail the following season.

I need not repeat here the directions for the general management I have given for apricots: exactly the same is required for peaches and nectarines, which may be grown with them; the same top dressing, liquid manuring, syringing, root-pruning, and winter management.

Peaches and nectarines, either in the open air or under glass, are inclined to grow too vigorously: pot culture here gives a great advantage; the trees should be lifted, so as to break off all the roots that are entering the border from the apertures at the bottom of the pot; this operation should be performed once a week, commencing the second week in June, and continued till the end of July; they may then be suffered to make roots into the border till the fruit is gathered. By this treatment the trees become sturdy and short-jointed; *i. e.*, very short spaces will be found between the buds. Trees that have been from five to seven years in pots will require abundance of water daily, in summer, as the pots become full of roots, and absorb a large quantity.

There is a matter of importance, in the culture of peaches and nectarines, to which I beg the reader's special attention, although it is a repetition, and that is free ventilation. In the warmer parts of England, and more particularly in Surrey, I have heard of two or three failures in growing peaches and nectarines in orchard houses, owing entirely to the attacks of the red spider, brought on by the unskilful management of servants, calling themselves gardeners, who would persist in shutting up their houses at four o'clock in the afternoon, in hot weather, and not opening them till nine in the morning; the poor trees were thus suffocated, and so enfeebled as not to be able to resist the attacks of this most persevering and insidious enemy. Now let me advise any one who has such a servant, to open all the shutters about the first week in July, and have them nailed so that they cannot be closed; they may remain so till the first of September. If the trees are regularly syringed, no red spider will make its appearance, and the fruit will be of much finer flavor for this constant and free ventilation. The usual and proper mode of ventilation is to have the shutters open by day all through the spring and early summer months, and open night and day as soon as the peaches begin to color, unless the house be in an exposed place, and the weather cold and windy, then they should be only partially open. But few gardeners have the courage to give air enough to orchard houses and vineries: in mine, without fire-heat, abundance of air is given night and day, from the middle of July till the grapes are ripe.

A very simple and agreeable method of retarding such mid-season peaches as the Noblesse, Royal George, and Grosse Mignonne, and all mid-season nectarines, may be practised as follows:—Remove the trees from the orchard house to the open air in the end of July (if the season is early, and the house is in a warm situation, a week earlier); place them in some warm sheltered place, or in front of a south or south-west wall, about two feet from it. In a few days both peaches and nectarines change to a deep crimson, and if the weather is sunny, their flavor will be very vinous and piquant. Under this treatment, such sorts as I have named above will ripen by the end of September, or later, according to the state of the weather. By this method, the season of our fine melting peaches and nectarines may be much prolonged, and, in cases where the absence of a family

may require it, the whole crop of an orchard house can be retarded. Half-standard peaches and nectarines with nice round heads, may be used as ornamental trees in the same way as recommended for apricots.

Within these few years a method of growing peach trees against walls has been brought into notice in France. This is called training "en cordon oblique," and is carried out by planting against walls, maiden trees twenty inches or two feet apart at an "angle of forty-five degrees." The lateral shoots are shortened in closely, and rigid summer pinching is practised, so that a wall is soon completely covered with short fruit-bearing shoots. In warm climates and in dry soils this method has been found to answer very well, but has been objected to in climates and soils of a contrary description, as the vigor of the trees is not restrained enough by the most severe summer pinching. The French gardeners do not know, or will not practise, root-pruning or annual removal, which would doubtless make these very pretty trees abundantly fruitful. The annexed is a figure of one of these oblique trees, from the work on pruning by M. Hardy.

FIG. 10.

A Peach Tree trained "en cordon oblique."

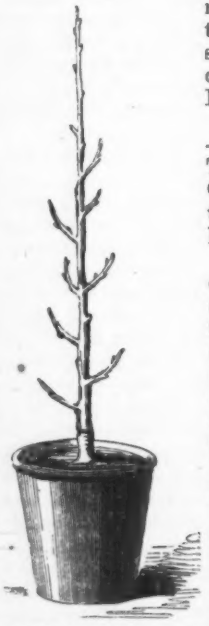
I now propose a modification of this mode of culture for the orchard house, by forming peach and nectarine trees into close compact pyramids like an upright cypress, and annex a figure of a maiden tree potted and pruned. For this purpose maiden trees with straight stems and well furnished with lateral shoots should be selected, and planted in 11-inch pots. They should not be more than from three and a half to four feet high; if more, their tops may be cut off to that height. Each lateral shoot should be cut in-to two buds; these and the buds in the stem will give numerous shoots: during the whole of the summer every shoot must have its point pinched off as soon as it has made six leaves; those that are weak and form their terminal bud at the fifth leaf need not be shortened. This incessant summer pinching of the shoots of a potted tree, in the climate of the orchard house, will, in one season, form a compact, cypress-like tree, crowded with short fruit-spurs. The second season these should be thinned out in February, so as to leave them as nearly as possible at regular distances, and in summer the fruit should be thinned and the shoots pinched as in the first season.

A close fruitful pyramid will thus be formed, on which the fruit will be fully exposed to the sun and air. A great number of trees may in this way be grown in a small space, and they will form beautiful objects of high culture. I have recently planted some trees of this description in one of the

borders of an orchard house, and intend to manage them after the method I have given as regards summer pinching; and lifting and replanting them every year early in November. A plantation of these pyramids, in a small span-roofed house, will, I am certain, prove most interesting and profitable.

The peach and nectarine season may be much prolonged by a judicious selection of varieties. The earliest peach is the Red Nutmeg, which will ripen in July (it is small, but very nice); next the Early Anne and the Early York, which ripen immediately after it; then the Acton Scot; the Early Grosse Mignonne; the Grosse Mignonne; the Noblesse; the Royal George; the Galande; the Reine des Vergers, a beautiful and hardy new peach; the Barrington; the Chancellor; the Walburton Admirable, a most *admirable* new variety; and the Late Admirable, of which the Teton de Venus and Bourdine are excellent varieties: these ripen nearly in succession, are all melting peaches, and give their fruit from July till the middle of October. I am also inclined to think, that with the large "Pavies" or clingstone peaches of France, such as the Pavie de Pompone, and the Catherine, the peach season may be prolonged till the middle or end of November. These very late peaches, on walls in moist climates, are quite worthless; but in the dry climate of the orchard house, although not high flavored, they serve to prolong the peach season. They should be cut in slices and served with wine and sugar, as in France.

FIG. 11.



A Maiden Peach Tree pruned to form a close Pyramid.

A selection of nectarines may include the following:—Fairchild's Early, small, but the earliest; Hunt's Tawny; Elruge; Hardwicke Seedling; Pitmaston Orange, very beautiful and very good; Violette Hâtive; New White; Roman; Early Newington; and Late Melting.

There is a race of nectarines from Syria well worthy of especial culture; the best of these is the Stanwick and seedlings raised from it. Many gardeners have failed in its culture, finding it crack, and drop off in stoning. It is easily cultivated in pots, but requires an orchard house gently heated: the best of houses for the culture of this fine fruit is the small span-roofed with boards, and heated by one 4-inch hot-water pipe round the house. As soon as the trees are in blossom in April, the fire may be lighted every morning at six and kept up till five in the afternoon all through May, giving abundance of air in the day, and a portion by night, although the crevices of the boards will admit some. In June and July the fire may be lighted at six in the morning, and suffered to go out at mid-day; the trees must be syringed regularly. By this treatment the fruit will ripen in the South of England in August, be clear, free from cracks, and the most perfect and delicious of all nectarines; its flavor is most peculiarly gratifying, and I have no hesitation in saying that no fruit can be imagined more exquisite in flavor.

(*To be Continued.*)

INQUIRY—AGAIN.

BY WM. BACON, RICHMOND, MASS.

WHY is not Horticulture one of the branches taught in our common schools? *Horticulturist* of January, 1859.

This has long been a query in our own and probably in the minds of many others, and we are very glad that some are beginning to speak out on the subject, in the hope that speaking will arouse action, while vigorous action will, we have no doubt, solve the problem and say it is done—very successfully taught.

But why is it not taught now? Certainly not because the individuals in these schools lack in disposition and ability to study those branches. The love of nature and all her works is not one of the lost attributes of man, following his expulsion from Eden. Who ever saw an infant that was not attracted and pleased by the gaudy colors of flowers or the glowing beauties of fruit; or that was not attracted by the hum of animated nature,—by the leaves trembling in the summer breeze, or the swaying of naked branches in the rough blasts of winter? It is an inborn principle of our nature to love and admire these, and when we cease to cultivate these principles and let other objects assume the position they have occupied, we enter upon an artificial state of existence, often full of yearnings for beautiful and quiet days, like those from which we are so estranged.

This love of nature does not leave us with the fleeting days of infancy. In youth we see it develop itself in stronger and more forcible illustrations. Planting, transplanting, sowing, nurturing, and harvesting then come in, and the desire for new creations of natural beauty causes the hands to labor for the gratification of the mind. We see it in little cultivated patches, in secluded nooks around the homesteads; we see it around the district school-house,—and among the recollections of our earliest school-boy days, there are none pleasanter than those when the corners of the old Virginia fence, near the old brown school-house, were farmed out among the juveniles for special cultivation, and brought into culture with such primitive tools as school-boys could manufacture, and such crops were started as school-wisdom dictated. Oh! what sadness has come over us, as some unlucky morning, when our crops had well advanced in growth, to look upon their ruin. But such sorrows were only for a season. The opening of another spring would cause fresh inspirations of hope to spring up in the youthful mind, and the labor was cheerfully gone through with again to end in the same disheartening results. Some vagrant animal would come by night and transform our hopeful fields to barren fallows.

This was nothing peculiar to us, to our school or to our day. We have seen the children of each successive generation, and of localities almost innumerable, acting and reacting in scenes like those we cherished, and at present we see no probability of the course being abandoned.

It may safely be inferred then that there is no lack of material to educate in horticultural knowledge in our common schools, and no obstacle in the way on the part of the material, of moulding it into the noblest forms of science and practice. A little teaching, drawing out of this natural taste, would be a great service in the matter, and probably greatly increase

the numbers as well as the knowledge of cultivators. Why are they not taught in common schools?

In the first place, then, we have no teachers competent to the work; education and habit lead them to look upon this matter as too small a one to come within their notice. Young men who teach are for the most part preparing for other professions, and their school-houses must be devoted to sciences in which they are more familiar, old stereotyped affairs, while the hours out of school must all be devoted to pleasure or the studies prefatory to some other pursuit. Many of our common schools are taught by females, like the daughter of a worthy and successful farmer we once knew, who almost fainted because ploughshare was said in her presence. She would probably have gone quite off, but for the admitted fact that she did not know what it was.

Our young lady teachers, unlike the young ladies of other lands, have more important communings than those with nature, to claim their attention. But the fault does not rest mainly that we have not teachers to instruct in rural arts. Parents and guardians have not yet acknowledged the estimation that should be given to an enlightened system of cultivation. If they would do so, and if the State would make it as imperative that teachers should instruct, or be capable of instructing, in some of the branches of rural arts, as it does that they shall be qualified to teach algebra and physiology, the time would be short before we should have teachers ready to commence; and our normal schools, so dependent on agricultural patronage for existence, and so full of philanthropy towards the rising generation, would have their experimental grounds, and their cabinets of natural history, their text-books and lectures, to prepare these teachers for a new and attractive enterprise.

We have long been of the opinion that the common schools should be made a nursery in which horticulture and its kindred arts should be kindly nourished. Let such an education be encouraged at home and fostered in these institutions, and the young cultivators of American soil would act from an intellectual impulse that would not cease when school-days were ended. The rills of knowledge poured into the mind there, would create a thirst that would be satisfied only by new and oft-repeated draughts of knowledge in all after-time.

Then how soon we should hear a call coming up from all the people in one united voice, too strong to be stifled with apathy, Give us higher and better endowed institutions all over the land, which is ours; wherein we, our sons and our children's children to all time, can learn the arts of nature, and successful cultivation of her healthful, luxurious, and life-sustaining products. Hitherto we have yielded our known rights to the advancement of other objects. From the earliest period of our country's history legislative aid has been granted in munificent sums for the support of institutions to advance men in other professions. To carry out these grants we have been taxed, and without complaint have given of the substance of our toil to favor these objects. In the trying hour that severed our country from foreign power, our fathers in a mass arose, left their rude ploughs in the furrow, and hastened to the fields of blood and carnage to drive the foe from our shores. The blood of our ancestors was spilled to give our country a place among nations. The funds have been liberally bestowed to make this an *enlightened nation.* We have neglected ourselves and *our*

profession, to establish other institutions upon permanent and successful bases. We feel now, that the time has fully come when educational aid should be given to us as a professional class on whom the prosperity of the country is very intimately connected. We strongly urge our claims, and shall never be satisfied until they are cancelled.

What a beautiful era it will be in the history of our country, when the sciences of earth-culture are introduced and successfully taught in our common schools! Then all the energy of cultivators will be awake in the study of natural causes and effects, as they operate on the art that feeds and beautifies the world.

One preliminary step has been taken to carry out this object. Our school-houses, instead of being located in cramped and useless spots, and set about three feet off the public highway, are being built with spacious grounds, the scholar's farms around them. Let these grounds be beautifully laid out, and planted under the eye of the scholar; and then let their future keeping be entrusted to the scholar, under the watchful care of the teacher. Gardens of beautiful trees, luscious fruits, and blushing flowers would then embellish these humble seminaries of learning, and a taste would be cultivated there to go forth to beautify and enrich the whole earth.

THE HYDRANGEA AND LUCULIA GRATISSIMA.

BY FOX MEADOW.

When Flora has once smitten the heart of man at any period of his life, especially in his youth, and the force of circumstances carries him from those higher orders of her gorgeous attractions—when he has to bid adieu to those splendid temples at whose altar he has oft worshipped and contributed his mite, it is not *time* that can efface from the heart or the memory, the beautiful forms that have been presented at the shrine of the "fair goddess."

No, not *time*, we say, for years may roll on—the physical system may droop, but the *memory*, ever fresh and green, revels in the reminiscences of the past, and the lovely forms spring into ideal life before him, and his heart gladdens at the appearance of some beauty *long lost to his vision.*

Thus we see before us the beautiful Luculia; and with all thy *age*, we "love thee still," Luculia gratissima!

Being suddenly aroused from this ideality with all the vivid splendor of this plant on our mind, we propose telling our amateur friends something about it; and giving our florists a hint in reference to its good qualifications as an attractive, ready-selling plant. Those unacquainted with this plant will be most likely to inquire, what is it like? Do you know the old and much esteemed "Hydrangea Hortensis? Yes. Well, it resembles that plant very much, with this exception: the texture of the foliage being much finer, and the color a lighter green; the large heads of flowers being of a lovely rose color, and highly fragrant.

To be able to appreciate this noble plant adequately, it is requisite to behold it in all its splendor; then the sight never can be forgotten. We

remember once standing by the side of a most magnificent specimen, some eight feet high, and nearly as much in its diameter (at Chiswick), literally covered with its fragrant rose-colored blooms. We also recollect one of the fair sex taking particular notice of the various plants in passing the tables, till she came suddenly on our favorite, when all at once she threw up both her arms and exclaimed, "Oh! oh! is it possible,—can I believe my own eyes!" We expected she would have fainted with ecstacy. The Luculia has generally been considered difficult to propagate and flower; so has the Hydrangea as a *pot* bloomer; growing too large and oftentimes not flowering at all. This is the character it generally bears, but with our mode of management we never encountered this difficulty. For example, we have a number of the Hydrangeas growing in open borders: about the end of September take off the ends of the shoots that are well ripened, with the green foliage on, (three or four joints long), place them in a close frame with a little bottom heat, and in ten to twelve days they are struck; pot into three-inch pots, and when they fill these small pots with roots they drop the leaf. They can be packed away through the winter similar to vines; not allowing them to get *too dry*, or they will die like anything else. In the spring when you require to start them, bring out to the light, and give a good soaking of water; *do not re-pot*, but let them grow in the small pot that they were stored away in through the winter, and generally at the second or third new wood joint they will show the bloom heads; *then re-pot* into a five or six-inch pot, as you please, and make the compost just as rich as it is possible, and afterwards water with plenty of *good guàno* (if such a thing is to be got); and the ultimate of this process will be heads of flowers measuring twelve to fifteen inches over, on plants in five-inch pots a little over twelve inches in height. When the soil is strongly impregnated with iron, the color of the flower changes to blue. Iron filings mixed through the potting will answer the same purpose. Now, in reference to the Luculia, the cuttings are managed in the same way, with this exception, that we keep them in a greenhouse through the winter on a shelf, rather than a cellar or under a stage, as in the case of Hydrangeas.

There is another mode by which the Luculia is very easily propagated. Take frames, or pits, put in plenty of good compost, and *plant out* the Luculia, and as it grows, *layer it*, similar to the carnation, either in small pots plunged into the soil, or in the soil itself. They root in a very short time, can be taken up, potted into small pots and managed as the cuttings. The stool plant continues growing rapidly, yielding a fresh supply for layers. We have taken several hundred young plants in the season, from three or four stool plants in this way. They will also emit roots freely, if growing in a high moist temperature, by notching the branches, tying moss on the parts and keeping it moist. They strike freely into the moss. This of course is only another method of layering. The two plants grown and flowered together in this way form a charming sight, and command a ready sale.

Won't some of our florists try this *modus operandi* with the Luculia and the Hydrangea?

The Luculia blooms freely through the winter season, and forms a great acquisition for the stove or greenhouse in the spring, and no conservatory should be without it.

GARDEN THERMOMETERS.

Upwards of a year ago we drew the attention of our subscribers to the important subject of garden thermometers, and pointed out certain improvements therein effected. Since that time, we are happy to be able to note that the attention therein drawn to the subject has been instrumental in effecting still greater improvement, combined with economy. Our friend,

Mr. George Cox, the well-known optician (5, Barbican, London), has specially directed his attention to the improvement of that most useful instrument, the garden thermometer, and we are glad to say with the greatest success.

We consider Mr. Cox entitled to the best thanks of the gardening public for his exertions in producing so fine and delicate a thermometer at so reasonable a price (3*s.* 6*d.*). This simple and accurate instrument is less expensive than registering thermometers previously in use, and equally correct. It shows the temperature at the time of observation, like any other thermometer; and when hung up horizontally, and the floating index tilted to run to the upper end of the spirit, it is set for determining the coldest point reached during the day or night. The spirit collapses over the top end of the index, and draws it down the tube, leaving it at the extremest degree of cold arrived at. The observer will then have the satisfaction of seeing how cold it has been since his last observation, and what is the present temperature.

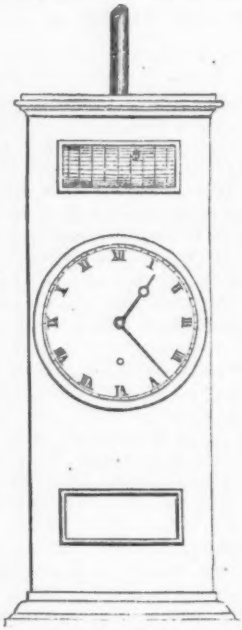
Our experience warrants us in saying that "Cox's garden thermometers" are decidedly the most inexpensive, durable, and correct of any previously in use; and we hope no gardener will neglect to provide himself with so useful a guide in all his operations. The fact is, and it cannot be disguised, that, as a body, horticulturists are not sufficiently alive to the importance of paying close attention to temperature and other meteorological conditions, although in scarcely any profession is it more necessary and beneficial.

A superior instrument has also been brought out by the same eminent maker, being a self-registering thermometer for both day and night, in which each tube is influenced by the same bulb. The centre bulb is filled with pure spirit, which expands by heat, and causes the mercurial column to descend on the left hand (or night) side, and ascend on the right hand (or day) side, carrying the index with it on the surface until the heat is diminished, when the index will be left at the maximum, or highest degree of temperature. This furnishes the registration for the day. For the night, as the temperature is decreased, the spirit contracts, and is followed by the column of quicksilver, which then ascends on the night side, and carries the index on its surface, until it reaches the minimum or coldest point.

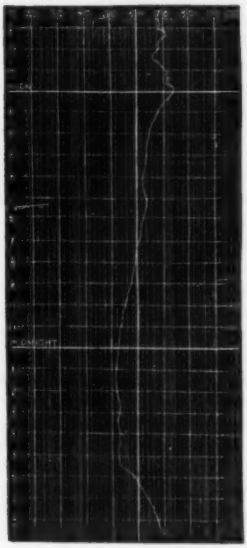
This instrument is eminently adapted for the open air, conservative walls, frames and pits, greenhouses, stoves, and every other erection connected with our "science of horticulture."

A more extraordinary instrument, very valuable, though more costly, is Mr. Gauntlett's new "Patent Chronometrical Thermometer," for horticultural purposes, for keeping a permanent, written record of atmospheric temperature, whether in doors or out. Every proprietor of a greenhouse or stove should possess one of these invaluable articles.

The novelty of this thermometer consists in metallic tubes being used in place of mercury, and in their connection with a clock movement, which puts in motion a drum, to which a strip of paper is attached. The thermometric tubes expand and contract as the temperature varies, and the motion thus produced is conveyed to a pencil that inscribes a line upon a strip of paper. This line is a permanent record of the temperature. When the strip of paper is filled up, a fresh strip is attached. These strips are ruled with lines, as shown in the following diagram; the vertical lines re-



Gauntlett's hronometrical Thermometer.



Scale traced by Gauntlett's Instrument.

present the thermometric scale. The horizontal lines correspond with the hours of the day and night. This instrument is chiefly valuable for horticultural purposes, where temperature is a matter of the first importance. The strip of paper shows at a glance what the temperature of a propagating-house, greenhouse, conservatory, etc., has been during any moment of the day or night, the precise moment when a change took place, and how long such change continued. The clock movement, which consists of an excellent eight-day timepiece, not only propels the strip exhibiting the temperature, but also shows the time. The action of this thermometer is very quick. Changes of temperature, however slight, are instantaneously indicated; this arises from the large amount of metallic surface exposed to the heated medium. The mercurial thermometer, on the contrary, is very slow in indicating slight changes of temperature. This is owing partly to the substance of the glass opposing an obstacle to the transmission of heat to

a certain extent, and partly to the bulk of the mercury offering so small a surface to be acted upon by heat, which must be diffused throughout the mass before any true indication can be given. This property of instantaneous indication renders the Chronometrical Thermometer peculiarly valuable for scientific purposes; we therefore unhesitatingly recommend it to the gardening public.—*Horticultural Cabinet.*

CALIFORNIA HORTICULTURE.

Editor of the Horticulturist:—I was pleased to see in your late number an article relative to this extensive field of horticultural enterprise. The author evinces considerable interest and knowledge of California horticulture, and will, I hope, add something to the storehouse of practical wisdom, whose doors are ever open to invite the studious and careful observer. What valuable facts California may yet contribute to this branch of industry and science, and what new and choice varieties of golden and amber fruits, the future will disclose! Already, our orchards and gardens contain peach seedlings of great beauty and rare excellence, which are more popular in our markets than the most favored kinds of established varieties. Our complete exemption from the insect pests which are so fatally destructive to smooth-skinned stone fruits, and particularly that "little Turk,"—as Downing calls him,—the curculio, is an advantage which we would like to share with our eastern friends, in return for the treasures with which our soil is already exulting. But the anxious inquiry naturally arises, will not the curculio sooner or later appear? will not the egg or embryo be introduced in the bark or roots of the trees brought hither from your infested orchards and nurseries? This is a question of much moment, and one that cannot fail to give concern to the propagators and lovers of the plum and the other fruits which are so congenial to this pertinacious little adversary. The borer is the only enemy of moment which gives us much trouble, and he is not difficult to manage. The pear-blight is an enemy, so far as my knowledge extends, from which we are entirely exempt. Our Doyennes, which are not yet abundant, are as fair and free from speck or crack as a lady apple; and so extraordinary in size, that one familiar with the fruit in Boston or New York, would scarce recognize it as of the same family. It is true, the trees are yet young, and their permanent character not quite established, but there is much ground to hope for continued success. The same superiority of size and appearance applies to all the other varieties. I have not, however, noticed any superiority in flavor over the fruits of the Atlantic shores, and question as a general thing, if they are quite equal.

I am much interested in the discussion progressing in your journal, relative to the merits of the quince stock. All the dwarfs of that kind which I have tried and have seen in the Sacramento Valley, are very promising, and are the delight of all. What age may develop in them, it is difficult to say. All large fruits undergo a singular metamorphosis in size, color, season of ripening, keeping qualities, &c., by transplantation from the Atlantic soil and climate to the Pacific, and in some of them they are not improved. Grapes, I think an exception, being improved in all respects: the deep alluvial and volcanic soils seem to be peculiarly adapted to them; and I have found no grape too tender for successful out-door culture;

indeed, I find our own California or Los Angelos grape the tenderest of all. We want only a railroad connecting the Sacramento and Missouri rivers, to make your markets blush with our wines, grapes, figs, pears, and other treasures of the soil, while the winds of opening spring and summer are yet blowing bleakly upon the blossoms and embryo fruits of your eastern hill-side trees.

California is destined to be the cornocopia of the confederated sisterhood, and her inhabitants are inspired with an almost blind enthusiasm in the cultivation of fruits and flowers. The easy working and richness of the soil, the deprivation heretofore suffered for want of these Eden luxuries, and the remunerative, almost fabulous prices which fruits have hitherto commanded, have all conspired to create this laudable enthusiasm.

Our agricultural fairs are as yet doing but little practically to encourage horticulture: money-making seems to be their primary object, and female equestrianism, and exhibitions foreign to the legitimate objects of the institution, seem to secure the principal encouragement. Rag dolls command the consideration and awards of grave committees, while horticultural enterprise occupies a place of secondary moment. What is most wanted in our annual fairs, is what heretofore we have been least able to get—good rational instruction and practical ideas. Men of little or no experimental knowledge are placed upon our committees as judges, because of their *standing in society*, their *scholastic attainments*, or the extensive grants over which they are the speculative landlords. From such committees what encouragement and information is the seeker after substantial facts to gain? In a recent report of the State Agricultural Society, I noticed a premium awarded to a gentleman of this city for "*the best cultivated garden;*" I had the curiosity to visit the place, and found it to consist of a lot 80 by 160 feet in dimensions. This ground contained the dwelling, stables, sheds and outhouses; a hothouse, and a large number of peach trees planted within four and five feet of each other, all over the ground, and looking like so many untrimmed willows, never having been shortened in an inch since they were planted. Their intense shade made them wiry, spindling, and almost destitute of fruit. Under these trees, where the sun's rays never penetrated, were the strawberry beds; but, alas, never a berry, and the vines, consisting of some six or seven kinds, were finally expelled because, never bearing, they were supposed to be barren kinds. Besides the foregoing, there were apple, pear, apricot, cherry, plum, almond, fig, nectarine, locust, ailanthus, grape vines, rose bushes, in great variety, and numerous ornamental shrubs and vines, crowded into the most absurd proximity, and like the others, fruitless and almost blossomless. This confused mass of culture and wicked waste, which would make a skilful gardener grieve, received a premium as the *best cultivated* garden. It was not favoritism that dictated the award, but sheer ignorance on the part of the committee, which did as well as it knew how. Such proofs of incapacity on the part of our committees, cannot fail to be attended with discouraging results. We are seekers after practical knowledge and the right road, and as an unerring guide-board pointing steadily to it, your journal seems to me to be the best indicator of the direction in which the adventurer should tread in his eager search for facts and hidden light. We are too much in earnest to be humbugged by quackery, and should be too prudent to prosecute our work in the dark.

W. C. F., *Sacramento.*

COTTAGERS' KALE.

People may write as they like about this Kale. It is a most excellent vegetable, and when well grown, and used in its proper season, it is delicious. Mr. Turner has not said, neither has my friend Dr. Lindley said, one word too much in its favor ;—I think hardly enough. I cannot avoid remarking, that I think some of the letters respecting it, which have appeared in your columns, were written rather prematurely, particularly as the writers of them had only one season's experience of the plants. Their season of usefulness had not arrived at the dates of some of them. Their perfection and usefulness can be best appreciated when other greens have vanished from wet, frost, and hardship of weather—then, and then only, can the real utility of, and benefit to be derived from, this Kale, be fully known and valued.—*J. C. Lyons, Ledestown, Mullingar, Ireland.*

[The above representation was engraved from a photograph of a fine plant of this Kale shown the other day to the Horticultural Society in Regent Street. It measured four feet in height from the surface of the pot, and was two feet one inch in circumference round the stem, sprouts and all. The total number of the latter was sixty-four. This was one of the most perfect specimens of this in all respects excellent winter green that we have yet seen.]—*London Gardeners' Chronicle.*

[This vegetable has been much commended abroad, but we have not yet seen it.—Ed.]

EDITOR'S TABLE.

To Contributors and Exchanges, &c., &c.

Communications, Letters, Catalogues, Periodicals, &c., &c., intended for the perusal of the Editor, should be uniformly directed to the HORTICULTURIST, *Germantown*, (*Philadelphia,*) *Pa.* Packages by Express, &c., should be directed to the Editor, as above, by name ; they will thus reach him almost beyond a doubt.

AN ESSAY *on Grades, Drainage, and Extension of the Public Grounds in the City of Washington, as a system of general improvement.* This luminous pamphlet has been sent to us in consequence of the remarks we made in letters from Washington, by Mr. J. Brooke, who we presume is the author. He has a keen sense of the disgraceful state of things there, and gives some information that is truly curious. It appears, for instance, that there are two systems of grades in the devoted city, which conflict at the intersection of streets and avenue, the one conducted by a city engineer, and the other by an engineer employed by the government—a wheel within a wheel, but contrary to the laws of mechanics, the inner acting independently of the outer. The city has taken upon itself to open and grade the streets under the authority of the government, but is unwilling to do anything to the avenues! And so it goes through the whole matter; nothing is done rightly, and the most important affairs are neglected entirely.

Now, the United States have spent a vast amount of money in so-called embellishments, architectural outlays giving the greatest amount of inconvenient and limited "accommodations" at the greatest possible cost, and yet the whole attempt ends in the same manner as if a private individual were to build his costly mansion in a brick-yard, and leave it full of red chips and mud holes.

Our author points out what ought to have been done, and says very justly on the subject of an arboretum: "A thorough knowledge of the vegetable kingdom, from the simplest formation of the *protophita* to the gigantic *sequoia*, should be inculcated by the institutions of the country generally, whose wide domain is so richly endowed with the most perfect living specimens. And they should be collected together and so arranged that 'he who runs may read,' and understand what he does read. This is effected by the formation of *arboretums* and *botanic gardens*. They form a laboratory where the natural elements and the arts combine to work out some of the most abstruse problems incident to the multifarious pursuits of man. Here, the science of botany asserts her prerogatives over agriculture, horticulture, arboriculture, floriculture, and many of the fine arts, while she becomes also the *handmaid* to all. The philosopher, the historian, the geographer, and the naturalist, come here as the peripatetics of old visited the *sacred groves*, to peruse the open book of nature,—the medical student to take counsel of *Hygeia*, the architect to study the ornate, the painter the beautiful, and the poet to realize the creations of imagination. Here the pious feel nearer to Deity, and the vicious awed by the consciousness of His more immediate presence."

He then examines the good effects of the London parks and other attractive improvements,

and adds: "Let us, with these facts before us, compare the condition of our own metropolis with that of our progenitors." The comparison is very greatly to our disadvantage. Malaria stalks even into the presidential mansion; the garish marble of the public buildings is reflected in the ooze of Goose Creek, echoing back the serenade of frogs! All the talk on the subject is but party juggling—

> "That palters with us in a double sense;
> That keeps the word of promise to our ear,
> And breaks it to our hope."

Our author gives his own views as to the best mode of proceeding, and we are quite disposed to endorse them. Every American citizen must desire that Washington may become his metropolis—the coronal of our own native land, and among nations the brightest gem of empire. With the proper improvements they would become the medium through their refining influence of enlarging the field of productive labor, as *nurseries* of the arts and sciences necessary to a thorough knowledge of agriculture, horticulture, arboriculture, floriculture; in fine, of *botany*, with its numerous correlatives, the acquisition of which would add more to the national wealth, to the quiet, home fireside enjoyments of city and country throughout this broad land, than all *other* learned professions put together, with *politics* superadded.

We are much indebted to Mr. Brooks for this interesting pamphlet.

MOUNTAINS OF NORTH CAROLINA.—Mr. S. B. Buckley has communicated to *Silliman's Journal* a very interesting paper, from which we make the following extracts. Of the *Pyrularia oleifera* noticed in this journal lately, he says: "Among several shrubs which we obtained for cultivation, the *Pyrularia oleifera* or oil-nut is peculiarly interesting. It grows to the height of from five to ten feet, and bears a pear-shaped fruit little more than an inch in diameter, which is so oily that it will burn like a candle if a wick be drawn through it. Squirrels are fond of it, and cattle have a great liking for the young branches and leaves of the *Pyrularia*. Last spring we saw an abundance of it in the edge of some woods fenced into a wheat field, and in October we again went there after the fruit; but the harvest was past,—the field had been pastured with cattle, which had destroyed nearly all of the *Pyrularia*. Hence it has already become rare, and the general occupancy of the mountains with herds of cattle and flocks of sheep would soon destroy it entirely. Mr. Durand, of Philadelphia, thinks that the oil expressed from it is superior to the best olive oil. Our specimens of the *Pyrularia* have been planted at Philadelphia, New York, and at the botanic garden of Cambridge, near Boston, and also some of them have been sent to Paris to the Acclimating Society of France, whose object is to acclimate useful trees, shrubs, and plants."

THE NEW LAWN GRASS.—A correspondent of the *London Chronicle*, in describing the garden of A. Mongredien, Esq., Forest Hill, Sydenham, says: "The gardens attached to this prettily situated suburban residence, though not extensive, are nevertheless in many respects extremely interesting. To Mr. Mongredien belongs the merit of having first pointed out that Spergula pilifera (of which a full account was given) was capable of forming an excellent substitute for grass in the formation of lawns. A piece of ground planted here four years ago with this pretty little moss-like Alpine is now, and has been for these three years past, closely covered with a carpet of the richest green—soft and elastic to the tread, and forming a turf equal to that of the finest grass, for which at first sight it might easily be mistaken. Over grass it however possesses many advantages; in the first place, it requires no mowing, and it is reported to withstand the effects of long continued drought better than any grass, remaining comparatively green when the latter has been burnt up. Another point in its favor is its evenness of surface, provided the ground laid down with it has been made so in the first instance—a matter of great importance—for as the plant itself never grows more than a ¼ or ½ an inch in height, any inequalities or other defects of formation are ever afterwards perceptible. After planting, the only care that it requires is sweeping and rolling. If left undisturbed it would be

one mass of white flowers in July; but as most people prefer a lawn perfectly green to one covered with blossoms, the latter should be removed by frequent sweepings with a fine besom. A birch broom is too rough for it. In forming a lawn with this plant, Mr. Mongredien's gardener, Mr. Summers, recommends the seeds, which are very small, to be sown behind a north wall, and when up to be transplanted where required, placing the plants regularly over the surface, at say six inches apart. On strong clay it sometimes assumes a yellow hue; but this has been found to be easily converted into a beautiful green by watering with weak liquid manure. Unforeseen disadvantages may yet arise however in connection with the employment of this as a lawn plant; but at present, judging from the little experiment that has been made with it, it certainly promises to answer perfectly, and in an economical point of view, seeing that mowing may be dispensed with, it cannot fail to be highly appreciated. A trial of it on a more extensive scale is now being carried out, the result of which we hope to be enabled to report hereafter. The gardens here, except where the glasshouses are, viz., on the top of the hill, slope abruptly to the north, and it is on this aspect that the plant has been tried."

[Seeds as well as plants of this grass have been received and are on trial in America, and we hope soon to report upon it.—ED.]

RHODODENDRONS.—Success in Rhododendron culture undoubtedly depends mainly upon the soil in which the plants are grown. Not that other circumstances are unimportant, or to be lightly regarded as items in the sum total of success; but a suitable soil being of primary consideration, the remaining conditions must be contingent on that. In general very erroneous opinions prevail as regards soil for Rhododendrons, and plants of analogous constitution and requirements. Possessors of gardens where the soil is naturally unsuitable for them, often lament their inability to combat that difficulty. Yet nothing is easier. The materials for a Rhododendron soil, to speak familiarly, lie at every man's door—certainly in the rubbish yard of his garden. Decayed vegetable matter in a highly comminuted state is the great indispensable; and, possessing this, which every one having a garden does in some form or other, the chief difficulty is overcome. Wherever the refuse of a garden has for years been allowed to accumulate is this decaying vegetable matter to be found, which, when mixed with a portion of sand or sandy loam, will grow Rhododendrons to perfection. Perhaps the most familiar form in which such vegetable matter is known is as leaf mould, and when that can be obtained it is to be preferred to any other. Two parts of this, with one of light loam and one of sand (white if it can be had), will form a compost for Rhododendrons which will leave nothing to be desired. Shade and coolness should be secured as much as possible—not that degree of shade which by permanently intercepting sunlight and air would inevitably induce weak and immature growths, to the destruction of the main end in view, flowers—but such grateful and partial shade as would at once temper heat and husband moisture. No shade is so grateful to the Rhododendron as that produced by trees. Yet they should not overhang the plants, but be sufficiently near to shade, without actually obstructing light.

GOLDEN HAMBURGH GRAPE.—We have now in hand an engraving of this superb grape from a specimen fruited by C. P. Bissell & Salter, of Rochester, N. Y., who are taking a lead in the cultivation of grapes. The vine is young, and produced but the one bunch; the Golden Hamburgh is to be one of the choicest fruits in even the smallest selection of sorts, going along with the inevitable Black Hamburgh, so universally known.

The same growers favored us with a sample of Childs' Superb, grown under glass. We scarcely think it worthy of a place in the grapery, but where it is a hardy grape, it will take a high rank. See answers to correspondents.

THE APPLE.—*The Pioneer Farmer*, published at Des Moines, contains an admirable paper on the apple, by James Smith, of that place. The lists of fruit adapted to that climate are so far satisfactory, as they are the result of the best experience, but he says: "My own expe-

rience with fruit has convinced me, that, like men, the best have their faults, and that if we look for a perfect fruit, and reject all else, we are doomed to disappointment."

In treating the subject in various aspects, he says: "Is it essential that a fruit should originate on a given soil or climate, to succeed well there? Let us look at the range of latitude that has produced all our popular western sorts: Fulton, from Illinois; Sweet June, Conn.; Early Joe, Jonathan, New York; Red Astrachan, Russia: Townsend, Pennsylvania: Red June, North Carolina; Benoni, Mass.; Duchess of Oldenburg, Russia; Maiden's Blush, Yellow Bellflower, Roman Stem, and Wine Sap, New Jersey; Early Pennock and Raule's Jannet, Virginia: Winter Sweet Paradise, Pennsylvania; Talman's Sweet, Rhode Island; Westfield Seeknofurther, Conn.; Fameuse, Canada; Keeswick, Coldin, England. The origin of the Lowell, and White Winter Pearmain, is unknown, but so far as I know, have succeeded well wherever tried.

"J. Van Buren, of Clarkesville, Georgia, who is styled the *apple-king* of the South, states, in the last volume of the *Horticulturist*, that his correspondents in Northern Kentucky and Northern Indiana, assure him that southern varieties of the apple withstand the winters there as well as those from the North. My own experience here, with southern varieties is, that they harden up their wood as well in the fall as those from the North, and I have the best authority for saying that this is their character in New York; while the Baldwin, Roxbury Russet, Sweet Bough, Rhode Island Greening, Newtown Pippin, and Ladies Sweet, the very cream of the eastern and northern catalogues, are ground cumberers in Central Iowa. I do not wish to be understood that we must look mainly to a southern climate for varieties adapted to our climate—far from it—but that we may introduce the choice varieties of almost all sections of the Union, with about equal hope of adding to our list of valuable fruits.

"But, in the face of all evidence, the advocates of seedlings will continue on their mission, preaching to the hitherto unfortunate fruit-growers, that, to be successful, they must return to seedlings, and when by a combination of circumstances, (improper selection of trees and sites for orchards, and neglect in planting and after-culture), they have made a few proselytes, they fancy themselves the forerunners of a new era in fruit-growing; and if they, like the great 'Apostle of Terra-Culture,' should demand fortunes in consideration of their great services, and were refused, as was *that messenger*, this, to them, would be one more evidence of the ingratitude of republics.

"The planting of seedlings from excellent sorts, however, is not to be discouraged, as it is only thus that new and valuable varieties can be originated."

A Singular Instance of Arboreous Vigor.—Our old friend, Charles Waterton, has commenced to write for the *London Gardeners' Chronicle* with his former terseness and tact. We copy the following curious fact: "Trees in walls are always rude intruders, having no business there. Seeds of trees floating down the torrent, or driven by the wind, will enter crevices of walls, and there take root with scanty means of nourishment. And if the superincumbent pressure of the stones be too strong for the new tenant to lift them up, it will gradually elbow itself out at the junction of the stones, and there in time form an excrescence on the face of the wall, holding the stones in its firm embrace. Dyer, the poet, must have witnessed this at Grongar Hill, when he described the ivy supporting the wall.

'There both a safety from the wind,
In mutual dependence find.'

"But we have here a phenomenon still more striking. It is of a nut tree supporting a large millstone. About a century ago our watermill of ancient days was destroyed, to make way for supposed improvements; and nothing now remains to show the spot where once it stood, save a huge millstone. For years it lay flat on the ground amongst surrounding cherry-trees, till in the autumn of 1811, some animal, possibly a squirrel, deposited a few nuts at the bottom of the hole in the centre of the millstone. During the following spring one of these nuts began to

germinate, and then raised its puny head out at the hole in the stone. One day I observed to a naval officer who was standing by, that the diminutive plant before us, if it lived and had good luck, would, in time, lift the millstone from the ground where it lay, and then support it. He doubted this. But time has shown that he was wrong in his surmise.

"The young nut-plant improved in health and strength till it entirely filled the cavity of the stone; so that, to the inspecting eye, the wood and stone seemed to form a compact body. It now began to lift the stone. Year after year this massive millstone rose a trifle from earth to sky, and whilst I am writing this, it is now nearly nine inches in mid air. The nuts are excellent, and always full grown; whilst the tree itself which bears them, sets tempests at defiance; and, notwithstanding its gigantic burden, is never seen even to totter when 'the stormy winds do blow.'

"It goes by the name of old Mr. Bull with the national debt round his neck. Facetious appellation! Nevertheless it seems to offer a lesson to the speculative politician, that this millstone must ultimately be smashed by the hand of man, or the tree itself must die of strangulation."—*Charles Waterton, Walton Hall.*

NEW PLANTS.—We have to thank Mr. Robert Buist for a contribution of fine plants which are in season for bedding. Among them the following verbenas: Sir Joseph Paxton, Lady Palmerston, Evening Star, (especially beautiful), Emperor, Lady Fitzroy, Rosy Gem, and Buist's Crimson Perfection. A new double Petunia of great merit, the Heliotrope Buist's Beauty, and four new Lantanas, viz.: Flavicona, Snow Ball, Marquis de Leporto, and Alba grandiflora. We are also indebted for a large plant of Brugmansia (Datura) Knightii; this placed along with the double white makes a very beautiful lawn object, both blooming freely together.

FOLIA ORCHIDACEA, Part VIII. (Matthews, 5, Upper Wellington Street) has appeared with five genera and the commencement of a sixth. To what extent the knowledge of orchids has extended may be judged from the following comparison of species before botanists in 1830 and and 1858.

	1830.	1858.
Stelis	9	135
Oberonia	13	52
Restrepia	1	9

LE JARDIN FRUITIER DU MUSEUM.—Nos. 18 to 21, both inclusive, of this handsome work have appeared, exclusively occupied by figures and descriptions of pears. Among the more interesting are the Poire de Pentecôte, with its aliases carefully worked out; the Duchesse d'Angoulême, once called Poire des Eparonnais; the Goulu Morceau, or as we call it, apparently improperly, Glou Morceau, originally brought out in 1759, but long overlooked notwithstanding its rare merit; Poire Tonneau, a stewing kind.

FLORE DES SERRES for December, 1857, has been published with original figures of the *Tom Thumb Tropæolum; de Pompon de Tirlemont Larkspur*, a handsome variety of the Siberian; some superb looking varieties of *Dianthus chinensis*, which, as Mr. Van Houtte observes, would have been regarded as Japanese lying wonders had not the Horticultural Society of St. Petersburgh stamped them with authenticity by giving them a gold medal; moreover, M. Regel, a name of weight, declares that he saw hundreds of them in flower with a Mr. Heddewig, and guarantees their being all that has been represented. Imagine flowers, thirty on a plant, of the deepest crimson, or crimson streaked with white, and three inches in diameter! We see that Mr. Van Houtte has seed on sale. Another plate represents what is called *Dianthus sinensis laciniatus*, another variety with enormous flowers, one form of which is single, pale, and lilac, the other smaller, the color of an Opium Poppy, but double; both being cut and slashed into numerous long sub-divisions. It is announced that the arrear of the *Flore* for 1858 will be

made up by the end of April, after which the numbers will appear with the same regularity as formerly.

ON THE COILING OF TENDRILS.—As much as twenty years ago, Mohl suggested that the coiling of tendrils "resulted from an irritability excited by contact." In 1850 he remarked that this view has had no particular approval to boast of, yet that nothing better has been put in its place. And in another paragraph of his admirable little treatise on the vegetable cell (contributed to Wagner's "Cyclopædia of Physiology)," he briefly says: "In my opinion, a dull irritability exists in the stems of twining plants and in tendrils." In other words, he suggests that the phenomenon is of the same nature, and owns the same cause (whatever that may be) as the closing of the leaves of the Sensitive plant at the touch, and a variety of similar movements observed in plants. The object of this note is to remark that the correctness of this view may be readily demonstrated.

For the tendrils in several common plants will coil up more or less promptly after being touched, or brought with a slight force into contact with a foreign body, and in some plants the movement of coiling is rapid enough to be directly seen by the eye: indeed, is considerably quicker than is needful for being visible. And, to complete the parallel, as the leaves of the Sensitive plant, and the like, after closing by irritation, resume after a while their ordinary expanded position, so the tendrils in two species of the Cucurbitaceæ, or squash family, experimented upon, after coiling in consequence of a touch, will uncoil into a straight position in the course of an hour; then they will coil up at a second touch, often more quickly than before; and this may be repeated three or four times in the course of six or seven hours.

My cursory observations have been principally made upon the Bur-Cucumber (Sicyos angulatus). To see the movement well, full-grown and out-stretched tendrils, which have not reached any support, should be selected, and a warm day; 77° Fahr. is high enough.

A tendril which was straight, except a slight hook at the tip, on being gently touched once or twice with a piece of wood on the upper side, coiled at the end into 2½—3 turns within a minute and a half. The motion began after an interval of several seconds, and fully half the coiling was quick enough to be very distinctly seen. After a little more than an hour had elapsed, it was found to be straight again. The contact was repeated, timing the result by the second-hand of a watch. The coiling began with four seconds, and made one circle and a quarter in about four seconds.

It had straightened again in an hour and five minutes (perhaps sooner, but it was then observed); and it coiled the third time on being touched rather firmly, but not so quickly as before, viz., 1¼ turns in half a minute.

I have indications of the same movement in the tendrils of the grape vine; but a favorable day has not occurred for the experiment since my attention was accidentally directed to the subject.

I have reason to think that the movement is caused by a contraction of the cells on the concave side of the coil, but I have not had an opportunity for making a decisive experiment.—*Prof. Asa Gray, in the Proceedings of the American Academy of Arts and Sciences.*

THE ILLUSTRATED BOUQUET, published by Messrs. Henderson, of the Wellington Road, London, improves with time. Part V. contains some very remarkable things extremely well figured. First and foremost is a capital figure of the Bootan Rhododendron, called R. Nuttallii, certainly one of the most glorious plants in cultivation, not yielding precedence to even R. Dalhousianum itself. With noble leaves of the largest size it bears masses of golden-eyed snow white flowers, represented in the drawings of eighteen inches round the edge, and actually in a dried specimen before us, measuring something more; a real goddess this among the crowds of inferior deities that follow in the train of Flora. Unfortunately the species is strictly greenhouse, not being able to bear even an inconsiderable degree of frost. It is probably the same as the Rhododendron found by Griffith in Bootan, on the ascent to Chupcha, grow-

ing in a wood of Quercus ilicifolia, at an elevation of 8,000 to 8,500 feet, and described as a small tree.

The second plate is occupied by a very good figure of Tritoma Uvaria, that gorgeous autumn hardy plant which has recovered its long lost reputation in consequence of having been taken into the favor of royalty at Osborne. The author of the remarks accompanying the plate makes five species of Tritoma, and three varieties of T. Uvaria itself.

A third plate is filled with huge flowers of four new Indian Azaleas, from the pencil of a Belgian artist; viz., Leopold I. and Duc de Brabant, rose-colored and much alike; Etoile de Gand, pink, with a few spots of carmine; and Reine des Panachées, white, streaked with crimson, apparently rather coarse and too much like other stripes now in cultivation.

The last plate includes a variety of Gardenia radicans, and a very fine representation of Messrs. Lee's beautiful Torenia now called pulcherrima, without exaggeration.

WEEDS AND WEEDING.—Now is the time that good gardening tells on the whole succeeding season, and it will be useful to read and reflect on the following from "Burgess's Amateur Gardener." If you don't mow your lawn frequently nothing will look right, and if your weeds obtain the mastery, the whole of your labor goes for little or nothing.

"'How does your garden get on?' is a question often followed by the reply, 'Oh, I am sorry to say it is smothered with weeds!' a confession too often corroborated by actual inspection. A garden properly treated in reference to weeding is comparatively a rare sight, except in large establishments. We often see ground well laid out, and not deficient in valuable plants, which are, indeed, smothered with sowthistle, groundsel, and chickweed. This state of things often arises from the peculiar arrangements people make with their gardeners, who visit the place perhaps once or twice a week. The consequence is, that weeding is often postponed to other matters which are more pressing, and the noxious productions are allowed to grow rampant and run to seed. A second crop of weeds may thus often spring up before their parents are dead, until the long deferred opportunity be presented; a desperate onslaught is made on the enemies, and for a few weeks a more decent aspect is secured. If, in all cases where the labor of a gardener is not sufficient, enough supernumerary help were secured, to prevent weeds getting ahead, the benefits would soon be manifest. We should like to see it acknowledged as indispensable, a *conditio sine qua non* in gardening, that no weed should be allowed to show a flower; for although this would not be all that neatness demands, the end would at length be attained, since without flowers there will be no seeds, and extermination must be the natural result. Let the amateur consider, first, how impossible it is to secure a pleasing appearance in the garden if weeds are allowed to grow, however small they may be. Compare the appearance of two beds, one quite clear and fresh raked, with another, sprinkled with weeds just displaying their cotyledons. However diminutive these may be, they mar the beauty of a parterre, and therefore should not be allowed to grow. Secondly, it should be borne in mind that rank weeds injure all growing crops, by taking from the soil that which is intended to secure their perfect development. It is vain to apply manure, if weeds are allowed to steal it. Thirdly, weeds which come to maturity send their roots deeply, and are not to be eradicated without considerable labor. Try to pull up thistles, for instance, and they will break off at the crown, only to furnish an abundant second crop, in a few days; to be prevented doing further mischief, the root must be dug up, which, in a garden of any size, will be a work of time and labor. Fourthly, weeds are very prolific, and if allowed to bear seed, some years may transpire before the effects are obliterated. These four considerations ought to be forcible enough to induce every gardener to resolve that he will henceforth give no quarter to weeds. As it is the expense which is often alleged as the grand impediment in the way of weed extermination, let the gardener compute the difference between a constant hoeing, &c., to prevent the growth of thieves, and the hard-tasked labor demanded to clear the ground when they are grown, and he will find, in a pecuniary point of view, the advantage is on the side of cleanliness. There can

be no doubt which is really the cheapest mode, when the superiority of clean crops is considered. Ply the hoe, then, well, rake your beds often, and you will reap great benefits. If in any case great weeds have grown up, they had better be cleared away by hand, for if allowed to fall on the soil, they often take root again, or shed their seeds before they can be raked away.

THE SCENT OF A STRAWBERRY BED.—June brings its strawberries with much more certainty than most fruits, and while our pages are flying through the land on the wings of the modern iron-horse, it may be hoped that the line upon line and precept upon precept that this journal has enforced are now giving full and plenty of strawberries and cream to all who read it. But did ever anybody smell the scent of a strawberry bed when its leaves are fading, except good Lady Ludlow?

The authoress of "Mary Barton," and the "Life of Charlotte Bronte," has penned a series of tales entitled "Round the Sofa," from which we make a short extract for the sake of its relation to our topics, and because, in the language of another, "It is like a draught of good clear ale to a stomach surfeited with ginger-beer and lemonade."

"Attar of Roses, again, Lady Ludlow disliked. She said it reminded her of the city and of merchants' wives,—over-rich, over-heavy, in its perfume; and Lilies of the Valley somehow fell under the same condemnation. They were most elegant and graceful to look at (my lady was most candid about this); flower, leaf, color—everything was refined about them but the smell; that was too strong. But the great hereditary faculty on which my lady piqued herself, and with reason—for I never met with any other person who possessed it—was the power she had of perceiving the delicious odor arising from a bed of strawberries in the late autumn, when the leaves were all fading and dying. 'Bacon's Essay' was one of the few books that lay about in my lady's rooms; and if you took it up and opened it carelessly, it was sure to fall apart at his 'Essay on Gardens.' 'Listen,' her ladyship would say, 'to what the great philosopher and statesman says:—' Next to that (he is speaking of violets,) my dear, is the musk rose, of which you remember the great bush at the corner of the south wall, just by the blue drawing-room windows. That is the old musk rose,—Shakspeare's musk rose—which is dying out through the kingdom now. But to return to my Lord Bacon: 'Then the strawberry leaves, dying with a most excellent cordial smell!' Now, the Hanburys can always smell this excellent cordial odor, and very delicious and refreshing it is. . . . . My dear, remember that you try if you can smell the scent of dying strawberry leaves in this next autumn. You have some of Ursula Hanbury's blood in you, and that gives you a chance.'"

RIVERS ON ORCHARD HOUSES.—To the temporary displacement of several esteemed articles from correspondents, we have made room to-day for about one-half of Mr. Rivers' extremely interesting and agreeable little book, from the fifth English edition, on Orchard Houses. It has not been previously published in this country, and as it is desirable to make the *Horticulturist* a work of reference for the future as well as interesting for the present, we take particular pleasure in introducing the subject so fully and ably to our readers. We find the following description of an Orchard House at Sydenham, England, in a late London periodical, showing the practical character of the operation.

"Among glass houses is an orchard house filled with beautiful little fruit trees in pots, now in full blossom, with the exception of the apricot-peach on which fruit is already fairly set. All are in 12-inch pots, not placed on beds of rich soil into which the roots are allowed to pass, but set on wooden stages or shelves, and liberally fed with liquid manure. Thus managed they bear abundantly, each peach and nectarine having on it from sixty to seventy fruit, and one had as many as eighty on one tree. The fruit, too, tasted in comparison with that from walls, proved the better flavored of the two. Plums bear most abundantly, as do also pears. The French plan of inserting fruit buds on barren spurs or naked branches has been largely practised here both in and out of doors, but with what result has yet to be proved, the work being only just completed. It may be mentioned that although this house is furnished with a hot water appa-

ratus, yet it is not used except in very severe winters. It has therefore not been required this season. The pots are mulched with old cloth waste, which costs 3*s*. 6*d*. per sack. It has a clean and neat appearance, keeps the soil from drying too rapidly, and from being washed into holes by repeated waterings. Among the pots in which the trees are growing are placed bedding plants, of which large quantities are required here in summer."

NEW ROSE.—The new rose, Dr. Kane, promises to rival the Salfaterre. Specimens of the bloom have been forwarded us by Mr. Pentland, of Baltimore, which we have not seen rivalled in this climate. It is to be brought out next season, and will, we are confident, become an immense favorite.

THE PROSPECTS OF FRUIT were probably never better than at the present time. The pear and cherry-trees, as a correspondent remarks, "are a perfect spectacle."

THE PEAR.—Mr. Hovey does not answer Dr. Russell's sustained charges respecting that "Boston pear" of his, but as was to be expected, contents himself with snowballing respectable people (one of whom H. knows perfectly well is abroad) through his lowest scavenger. Very like. What *is* the *price* of the newest and best pear with the aroma of "*champagne?*" Is it champagne made from apples, or grapes? Can it be possible that Mr. H. aspires to be president of the Massachusetts Horticultural Society?

NEW REMEDY FOR THE CURCULIO.—Beat carpets under the tree every Saturday during the month of June! MARY.

CATALOGUES, &C., RECEIVED.—The season for the issue of new catalogues of trees and plants has waned. The following are all that have come to hand.

Supplément aux Catalogues de Vilmorin-Andrieux et Cie, Quai de Mégesserie, 30, a Paris.

This contains many novelties, and also interesting remarks on plants which have already been introduced.

State Agricultural Journal, extra,—List of Premiums and Regulations for the 19th Exhibition, Oct. 4, 5, 6, 7, 1859. Judicious as usual.

Annual Report of the Agricultural Society of New Jersey, for 1858; from Wm. M. Force, Secretary. A very interesting and valuable report.

Reports of the committees for 1858, of the Rhode Island Horticultural Society, and the schedule of premiums for 1859. This Society is one of activity and importance. All their doings strike us favorably, and this pamphlet confirms our good opinion. The pamphlet contains a very proper and feeling obituary of the late President of the Society, Stephen H. Smith, Esq.

"New Catalogue des plantes, exotiques, nouvelles, et rares," cultivated by Linden, of the Royal Zoölogical and Horticultural Society of Brussels. The skill and enterprise of this indefatigable naturalist have long since placed him among the very highest of those plant *merchants* to whose efforts our gardens have of late become so deeply indebted; and the list now before us completely justifies the European reputation which our estimable correspondent has most deservedly obtained. The list commences by a description of thirteen new stove and greenhouse plants, of great beauty, now offered for the first time, among which Beloperone violacea, Cuphea ocymoides, Centradenia grandifolia, Arachnotrix rosea, Lindenia rivalis, and three superb Begonias called amabilis, argentea, and Victoria, are represented by colored figures, themselves examples of artistic skill. There are also seven new fine-foliaged plants, all from tropical or temperate America. Twenty entirely new and highly decorative plants in one season are in themselves evidence of the vigor with which Mr. Linden prosecutes his system of importation from distant countries. Of plants more or less known the catalogue contains, of fine-foliaged species, 164; of variegated plants, 96; of flowering stove plants, 620; of tropical "fruit" trees, 105 (but this does not always mean edible fruit); of exotic useful, including medical plants, about 150, among which are many of great rarity; of Araliads, between 30 and 40; nearly 50 Bromeliads; of Ferns and Lycopods, 343, of which 37 are tree Ferns, and

above 60 quite new, and for the most part extremely handsome. Moreover there are nearly 600 orchids, some of which are very rare, and we believe quite unknown in this country. We observe an announcement by Mr. Linden that he has now withdrawn his collectors from tropical America, and is receiving consignments from Cochin China, Celebes, and Mindanao.—*Gardeners' Chronicle.*

ANSWERS TO CORRESPONDENTS.

"When apples or pears are grafted on the limbs of old trees, do they not invariably bear the third year? often the second? and sometimes even the first year?"—Answer—Yes. "Now if such be true of the limbs of old trees for stocks, would not the same hold true of the roots of old trees?"—Answer—No: no more than it holds true because beefsteak inserted into the human mouth goes into the stomach and is digested, therefore, inserted into the ears it would be equally nutritious to the system.—"In other words, if root-grafting be employed on the roots of old or matured trees, will not the graft bear as early as when grafted on an old limb?" Answer—No. "Have any of your readers sufficient personal experience in grafting on old roots to answer this question?"—Answer—Plenty of people. This subject of root-grafting, or seedling-stock grafting, was question 9 at the January meeting of the *Fruit-Growers' Society of Western New York*, and the experience of 200 of the best fruit-growers in western New York, was without exception in favor of seedling-stock grafting "as respects growth, durability, and productiveness," and no one advocated using the roots of old trees. See that report on p. 104. "And if it be true, would not the pear grafted on the old pear root be hardier than when grafted on the quince? and productive at an earlier age? and as long lived as the pear-tree itself? Does it not stand to reason that such is the fact?"—Answer—As it is *not* true, these questions answer themselves. A standard pear as grown in our nurseries now, is long lived.

"2d. Would that tree be an acquisition to the horticultural world as a stock for dwarf or other purposes?"—Answer—This can only be made certain by actual experiment; but as we now graft the cherry on Mahaleb stock, and it grows beautifully, the probability is that Mahaleb is good enough.

"3d. I had determined to plant forty or fifty pear-trees, but want to know the best on the quince."—Answer—Duchesse d'Angouleme, Vicar of Winkfield, Beurré Diel, Louise Bonne de Jersey, Buffam, Kirtland. Second six. Van Mons Leon Le Clerc, Golden Beurré of Bilboa, Baronne Mello, Doyenne Goubault, Beurré d'Amalis, English Jargonelle. Some think highly of Urbaniste, &c. These 12 are the result of experience.

An occasional and valued correspondent in Oneida Co., N. Y., whose contributions we hope often to receive, has addressed us in relation to the Childs' Superb grape.

We had inquired of Mr. Bissell about it, and published his kind answer lately, and this gentleman, who has eaten the grape every season for eight or ten years, fully bears out Mr. B. in all he says.

1st. As to foreign origin, although some claim it to be a pure native, and hardy. Mr. B. has sent us some leaves which prove beyond dispute its foreign origin, and that if it is a seedling, it is from seeds of foreign vines of the Chasselas family.

2d. As far north as Utica and Rochester it needs protection in winter.

3d. Under glass it is fair.

4th. South of where Catawba always ripens well, it will prove very valuable for out-of-door culture.

While there are so many propagators of grape-vines who from interested motives will insist that any pet grape of theirs is pure native, and hardy, we are glad to receive corroborations of Bissell & Salter's endeavors to state things just as they are. The editor of the "Country Gentleman," in quoting the opinions of Mr. H. E. Hooker, (a Rochester nurseryman), says that he "has the reputation of always adopting and advocating opinions without respect to his per-

sonal profit;" and it is important, when the public are purchasing so many of these new varieties, that they should know just what they are buying, and have confidence in the gentlemen who furnish the sorts.

Gossip.

CLIMATOLOGY.—It is the general opinion that all parts of this continent are formidable from their severe climate at such latitudes as we know the Canadas and Salvador to be formidable, while in truth these districts afford no guide whatever to the climate of the interior and west coasts. Deriving our ideas from like geographical positions in Europe, we may see that at the West ten degrees of latitude does not more than express the amelioration of those areas over the areas at the East. The winter of Norfolk is transferred to Puget's Sound, that of Washington nearly to Sitka, latitude 57°, the highest observed point of the Pacific coast—the one ten degrees, the other eighteen degrees of latitude of difference. The plains of the Missouri, &c., afford contrasts with the land areas of the East nearly as great, and in the train of each of these general facts the most important industrial and commercial results must follow. Precision in the knowledge of vast areas where our advancing population is soon to go, is one of the great advantages to result from climatological studies, such as those of Mr. Blodgett and Franklin B. Hough, of Albany. The former has written a successful book; and the latter, in a pamphlet some time since published at the capital of the State of New York, has an amount of popular and valuable information, that is much to his credit as an observer as well as a philosopher.

IRVING PARK.—A novel and very admirable idea is in process of being carried out at Tarrytown, on the Hudson. About one hundred acres of ground, adjoining Sleepy Hollow—made memorable by Irving's pen—have been converted into a park, which, when finished, will contain carriage drives of several miles in extent, neatly kept walks for promenaders, and spacious lawns and sloping terraces where children can play and gambol. Within this park are villa sites, from one or two to six or eight acres in extent, which are for sale; and each purchaser will not only possess a charming homestead, but, also, be guaranteed all the privileges of the park, which ground will be for the use and benefit and under the control of the owners of the sites. It is scarcely necessary to speak of the natural scenery which surrounds this park—enough to say that it commands extensive views of three counties, and of the entire sweep of the Hudson for several miles.

This system of united effort will become the custom when its advantages are more disseminated.

RAIN is derived from a permanent source, viz., the waters of the globe, and chiefly the ocean, whence it is raised by evaporation, occasioned principally by the action of the sun's rays. The air is the vehicle in which it ascends in the state of invisible vapor, and the higher the temperature of the air the more vapor it will carry. Thus, at 66° Fahrenheit, each cubic foot of air will hold in solution fully seven grains of water; but at 45°, little more than half that quantity. It is therefore evident that if air at the former temperature, and completely saturated, be cooled by contact and mixture with colder air, the same quantity of moisture can no longer be maintained. If the warmer and colder portions have each as much moisture as they can carry, and if that at 66° should be cooled down, say to 45°, it must then part with half its load, unless the cold air mixing with the warmer is in a comparatively dry state, and then a portion at least of the superfluous moisture will be absorbed.

The general theory of rain may be expressed in a few words: it is vapor raised by heat and condensed by cold. In fact, the Huttonian theory, the one mostly approved, amounts to this. Some, however, attribute a considerable share of the process to electricity.

RYE—SEA WEEDS.—We find in the *Bulletin* of the Natural History Society of Lausanne, a notice of a single plant of rye, self-sown in a vineyard near Villeneuve, which produced 2248 grains. And we may call attention here to the prize offered through the Society of Arts for the best paper on sea-weeds: competitors are required to discuss the subject of marine algæ, with regard to their utility as food and medicine, and for industrial purposes. We can tell them of a use to which one of the weeds—that known as *alva marina*—has been applied at Brest; namely, as wads for small-arms and cannon. The weed is washed and dried to prevent the absorption of damp, and it has the advantage of being elastic and incombustible.

Correspondence.

MR. EDITOR:—I found, some time since, a description of a verbena pot, and have had one made which I find extremely useful. It has a drain hole, and sufficient depth for the roots, while the surface being large, a mass of bloom may be secured, and combinations, variety of colors, or single colors may be introduced, as taste may indicate.

Bury the pot in the earth, leaving a few small stones around the opening to secure sufficient drainage.

It was invented I think for seedlings, but I use it entirely as a pot for the lawn, &c., &c., and to bring into my plant cabinet in winter. Yours, &c., W. W. T.

NOMENCLATURE OF PEARS.—I wonder, very seriously, Mr. Editor, whether we shall ever be able to say that the time has arrived when the nomenclature of our fruits is perfectly free from confusion? At present, the prospect is not very encouraging; for, although within ten years past much has been done towards effecting such a consummation, there is still a large number of fruits whose names are in a very uncertain condition. Some pears are so particularly unfortunate in this respect, that no two authorities can be found to agree upon their proper cognomens. Had we in this fair country an experimental garden, we might hope to make more rapid progress in this important branch of pomological science, but in the absence of the best method of accomplishing the desired object, we must await the slow and not always satisfactory results of individual experiment.

I am led to these reflections by my own recent experience. Having a great fondness for pomological study, as well as practice, I have been lately devoting some leisure hours to a comparison and examination of authorities, with a view to solve to my own satisfaction, if possible, the doubts which obscure the fair names of certain varieties. In this attempt I do illy succeed, and find myself so completely puzzled by contradictory assertions and descriptions, that I have determined to state one case, to the solution of which my moderate extent of pomological lore is totally inadequate, in your pages, in the hope that pomologists of more age and experience may give their opinions upon it.

In Mr. Downing's work the Beurré de Beaumont is described as a "highly delicious" pear, medium, roundish, obovate; ripening in October: and the Bezi Vaet as a medium, obovate variety; ripe from November to January, but ranking only as "a good second rate" sort.

In the revised edition of the same work, the latter description is reproduced without alteration, and Beurré de Beaumont placed as a synonym, while upon another page I find the same outline which in the former edition was used for Beurré de Beaumont, placed under the name of Beymont, with the synonym of Beurré Bieumont, which is described as "medium, or above obovate, truncate, or obtuse pyriform;" ripe from October to December; and "gives promise of great excellence." In the same work, Beurré Le Fevre (synonym, B. de Mortefontaine) receives this brief notice: "Fruit large, irregularly oval, very transient, not valuable."

Mr. Hovey, in his fruits, gives a description of the Beurré Beaumont, which agrees nearly with that of Mr. Downing of the Beurré de Beaumont, and speaks of it as "a most excellent pear." He gives as synonyms, B. Le Fevre and B. de Montefortaine. If, as I presume, Mortefontaine and Montefortaine are intended to mean the same thing, there is a wide difference in the two characters ascribed to the variety.

A pomological congress was held at Lyons, (France), in 1856, a notice of which is given in "Hovey's Magazine" of the following year, with a list of names and synonyms of pears, as established by that body. Among them is Beurré Beaumont, with the following synonyms, B. de Beaumont, Beymont, Belmont, Bezy Waet, Bezy de St. Wast; appended to this is a note by Mr. Hovey, to the effect that, "Bezy Waet is the proper name; Belmont is one of Mr. Knight's."

Again, in Leroy's catalogue, Beymont is placed as a synonym of Beurré de Rance; ripe from January to April, while Beurré de Beaumont is a synonym of Bezi St. Vaast, and spoken of as "medium, first quality, December to January." And Beurré Le Fevre, with which B. de Mortefontaine is synonymous, is classed among the cooking pears, as "medium, third quality; September and October."

If I am not mistaken, I have heard Col. Wilder state that Bezi Vaet and St. Vaast were identical, some years since, so that we have all these conflicting statements to choose from. If the same pears are cultivated by each under the same names, some one is wonderfully mistaken about the quality and season.

DOWNING:—B. de Beaumont, Oct.; Bezi Vaet, Nov. to Jan.

CHAS. DOWNING:—Bezi Vaet, B. de Beaumont, Nov. to Jan.; Beymont, B. Bieumont, Oct. to Dec; B. Le Fevre, B. de Mortefontaine.

HOVEY:—B. Beaumont, B. Le Fevre, B. de Montefortaine, Sept.

POM. CONGRESS OF LYONS:—B. Beaumont, B. de Beaumont, Beymont, Bezy de St. Wast, Belmont, Bezy Waet.

LEROY:—B, de Rance, Beymont, Jan. to April; Bezi St. Vaast, B. Beaumont, Dec. to Jan.; B. de Mortefontaine, B. Le Fevre, Sept., Oct.

WILDER:—Bezi Vaet, St. Vaast.

Now, Mr. Editor, is not all this extremely unsatisfactory? I shall not attempt to reconcile the contradictory descriptions, but trust to some one more capable than myself. If such an one will take the trouble to solve the problem, he shall receive the thanks of

A YOUNG POMOLOGIST.

DEAR SIR:—Will some of your readers, who can suggest a remedy to prevent the flow of sap, or "bleeding," as it is usually called, from the grape-vine, when cut or broken, favor us by communicating their experience, that if anything new is successful, growers of this excellent fruit may have the benefit of it? And oblige, FRANCIS A. BROWER.

Woodland Park, Mass.

HOW TO INCREASE THE SIZE OF FRUITS.—By A. Dubreuil.

[Translated from the "Journal de l'Academie d'Horticulture de Gand."]

Several persons having requested information as to the processes by which we may increase the size of fruits, we shall here point out the principal operations for obtaining this result.

1. *Grafting the Trees on a weak species of Stock.*—Fruits, like leaves, have the power of attracting the sap from the roots, and of transforming it into cambium, or organizable matter. But contrary to that which takes place in the leaves, they employ all the cambium which they thus elaborate for their own nourishment. If the stock on which the tree is worked is naturally possessed of great vigor, the tree will produce numerous long shoots which will appropriate the greater portion of the sap, to the detriment of the fruits, which will consequently not attain a large size. They will, on the contrary, acquire a larger size if their absorptive power can counterbalance that of the shoots. It is for this reason that, all other things being equal, the fruit of trees worked on the quince stock is larger than that from trees worked on the pear stock. The same thing takes place with regard to apple-trees grafted on the Paradise, as compared with those on the Crab stock.

2. *Subjecting the Trees to a Proper mode of Pruning.*—This operation, when well performed, has the effect of depriving the trees of a certain portion of their shoots. Hence it follows that a great portion of sap which would have been absorbed by the parts cut off goes to increase the size of the fruit. The object of summer pruning is likewise the complete or partial removal of a large number of shoots by disbudding and pinching. These operations also contribute to turn the sap to the benefit of the fruit; and under like circumstances, the fruit of well pruned trees is always larger than that from trees left unpruned.

3. *Operating so that the Bearing Shoots may be as short as possible, and in immediate connection with the main branches.*—If the mode of pruning adopted is such that the bearing shoots immediately proceed from the principal branches, the consequence is that the fruit receiving the sap more directly from the roots acquires a larger size. In fact, it is seen that fruit growing on the stem is always larger than that situated at the extremities of long slender branches.

4. *Thinning the Fruits when too numerous.*—The quantity of sap, disposable for the growth of the tree, does not increase in proportion to the fruit which it bears. It is, therefore, apparent that the more numerous the fruits, the less the amount which each receives. Hence the utility of thinning, in order that those retained may be better nourished and become larger. The proper time for performing this operation is when the fruits are fully set.

5. *Shortening the Principal Branches.*—If the length of the principal branches is to a certain extent diminished by shortening them at the winter pruning, a result analogous to that produced by ordinary pruning will follow; but the effect on the fruit is much more intense because the action of the sap is confined within narrower limits. It is, however, important to check in summer the vigorous shoots, of which a great number will be sure to make their appearance, otherwise they would absorb a large amount of sap to the detriment of the fruit.

6. *Supporting the Fruits so that their Weight may not cause a strain upon the Footstalk.*—The sap from the roots enters the fruit by means of vessels passing along the footstalk, and which ramify to an infinite extent throughout the cellular mass. Bulky fruits, such as pears and apples, soon attain such a weight that they exert a strain on their footstalks, which, by tightening the woody fibres and vessels, tends to collapse them. The tissues of the stalk being thus compressed, the passage of fluids is, to some extent, obstructed in that part. Moreover, if fruits are attached to a branch having a more or less vertical direction, their gravity will cause a bending of the stalk, and will thus still further obstruct the passage of the sap. Again, it often happens that the fruit does not make an equal growth on both sides of its longitudinal axis, and a twisting of the stalk and strangling of the vessels take place, in consequence of which the circulation is partially intercepted. Now, if a support is placed beneath the fruit so as to prevent these effects on the stalk, it is very evident that the sap will flow in much greater abundance into the fruit, which will then become larger. This is the reason why those fruits which accidentally rest on branches or trellises are always of greater size than the rest.

7. *Moderating the amount of Evaporation from the Fruit.*—In order that fruits may swell, their epidermis or skin must be continually expanding, so as to make room for fresh tissues which are forming in the interior, and the new fluids that are accumulating there. If all the parts of fruit are directly exposed to the full force of the sun and the drying action of the air, it will lose by evaporation an amount of fluid nearly equal to that which it receives from the roots, and its growth will therefore be less rapid. On the other hand, the tissues nearest the outside will acquire a greater degree of firmness, and lose to some extent their elasticity; they will offer more resistance to the expansion of the interior tissue, and will consequently restrict the growth of the fruit. If, on the contrary, the latter is kept in the shade, these influences will not affect it, and it will become larger. Indeed, this may be observed in the greater proportion of fruits covered by leaves as compared with those on the same tree, not so covered. It is necessary, however, in order that shading may not affect the quality of the fruit, to expose

the latter when full grown to the direct action of the sun. To diminished evaporation must also be attributed the considerable increase in size which always takes place in fruit introduced into bottles soon after it is set. The mouth of the bottle being closed after the portion of branch with the young fruit is introduced, the latter is secluded from the drying action of the air, and is constantly surrounded with a moist, warm atmosphere, which keeps the epidermis pliable, and stimulates the growth of the tissues.

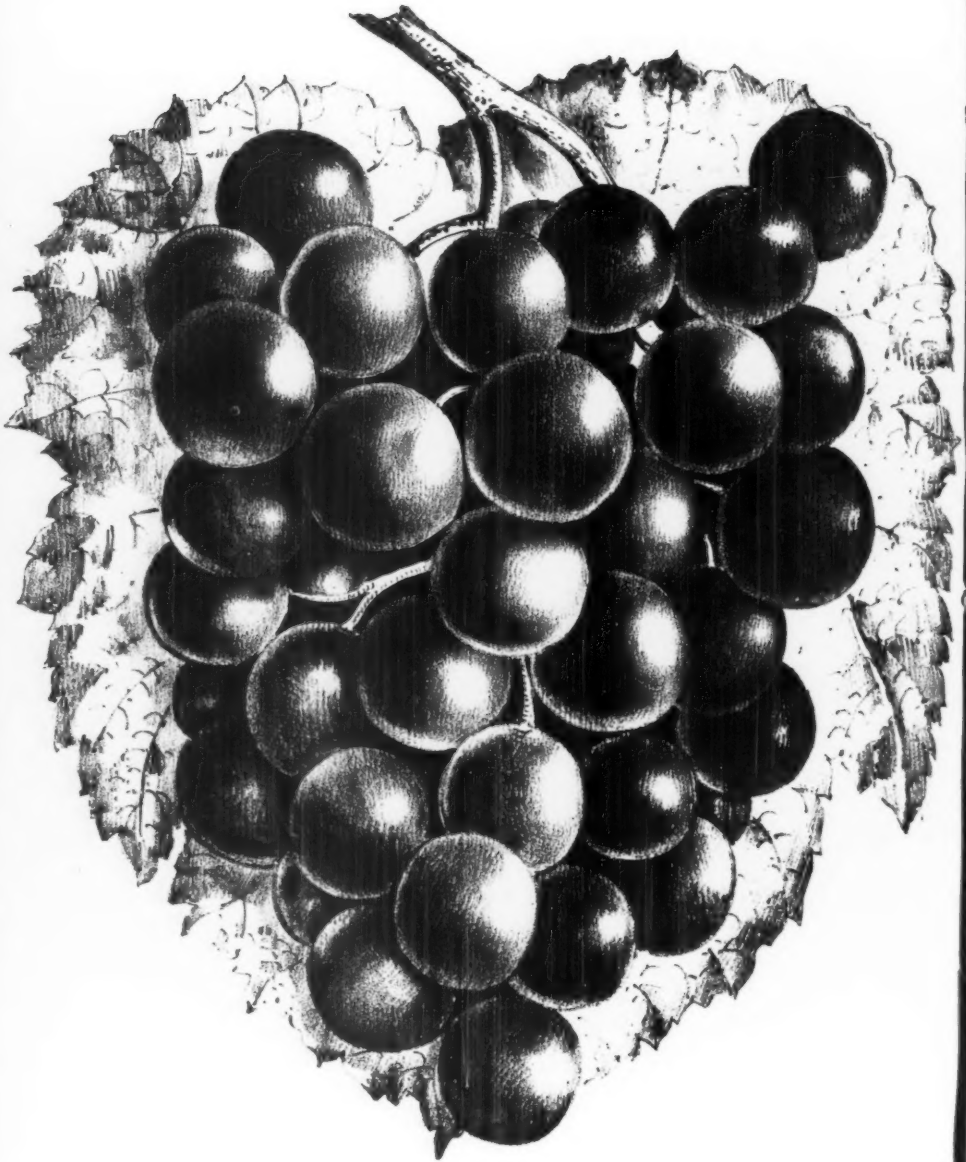
8. *Moistening the fruits with a Solution of Iron (copperas).*—We have already stated that fruit has the power of drawing towards it sap from the roots. If means can be found of stimulating its vital energy it will be perceived that it will absorb a greater amount of sap and attain a larger size. Now, M. Eusèbe Gris has proved that a solution of sulphate of iron applied to the leaves has the effect of increasing their absorptive powers, and stimulating their cellular tissue; and it was only reasonable to suppose that salt would produce the same effect on the fruit. This, indeed, has been ascertained by M. Arthur Gris, who has continued the interesting researches of his father. He has proved that melons, and various species of fruit trees, the green parts of which had been watered on several occasions with a weak solution of sulphate of iron, yielded much larger fruits than those not so treated. One of my pupils repeated the same experiment in 1854 and 1855 on pear-trees. He gave the first watering as soon as the fruits were fairly set, in the end of June. He repeated the moistening every fortnight, in the evening, in order to prevent evaporation, and that absorption might be completely effected during the night. The solution was at the rate of 26 grains to a quart for the first three, and 35 grains per quart for the two last waterings. He sent us, in the end of February from a tree thus treated, an Easter Beurré, so large that it could scarcely be recognized. He obtained like results in the following season.

But we doubt whether the results would not be still more successful if the fruits alone were moistened with the solution, for then they only would experience the stimulation of their absorptive powers, and would thus draw to themselves a much greater quantity of sap, inasmuch as the absorption by the leaves would be much less intense. Experiments should therefore be made with regard to this point.

9. *Ringing the Shoot or Branch immediately below the Flowers.*—Lancry exhibited to the Société d'Agriculture de Paris in 1776 a branch of a plum-tree which he had ringed. The fruits situated above the incision were much larger than those beneath it, and their ripening much farther advanced. Colonel Bouchotte, of Metz, thought of practicing this operation on vines, in order to accelerate their ripening. He ringed about 60 perches, and the grapes were larger and 15 days earlier. I have within the last twelve years repeated the experiment nearly every year on vines against walls, and always with like results. I have also tried it with the same success on the bearing shoots of the peach-tree. It is necessary to perform the operation when the flowers are opening; the longer it is delayed after this period, the less is the effect produced. The incision should penetrate to the wood, and the ring of bark removed should have a width equal to half the diameter of the shoot. The width, however, should not exceed one-fifth of an inch, otherwise the wound will not close up, and the success of the operation will be affected. For removing this ring of bark we have invented a small instrument, called a *coupe-sève*.

10. *Inserting on vigorous trees fruit-buds, with a portion of wood attached (Greffes en ecusson Girardin).*—This proceeding is only applicable to apples and pears. [Chiefly to these we should say; for it has succeeded even in the case of stone-fruit]. A tree which in consequence of excessive vigor has never produced blossom buds, may by this means be made to produce fruit of large size from the abundant supply of sap which the inserted blossom buds will receive. But in order to derive the greatest benefit, it is necessary during the growing season to pinch the vigorous shoots of the tree, otherwise these shoots would absorb the largest portion of the sap to the injury of the fruit.

11. *Inarching vigorous shoots on the footstalks of young fruits on the same tree, or on the bearing shoots near to where the fruits are attached.*—Professor Thouin describes Monographie des Greffes, a similar operation under the name of Greffe par approche Leberriays. M. Luizet, of Equilly, who certainly did not know of that description, again discovered this kind of inarching, and practiced it with the view of increasing the size of fruits. This is how he operates: About the end of June he selects a vigorous shoot, which he inarches upon the peduncle of a fruit; then as soon as the union is effected and the shoot has grown sufficiently to draw the sap in large quantity towards the junction, he pinches the shoot in order to prevent it from absorbing too much sap to the injury of the fruit. When the stalk is too short, the shoot is inarched on the opposite side of the branch to that on which the fruit is situated. In both cases the shoot thus inarched acts as a nurse to the fruit, by drawing to its vicinity a large quantity of sap, and thus contributing to greatly increase its bulk. M. Luizet exhibited, in September last, at the Exhibition of the Paris Horticultural Society, Easter Beurré and Grosse Calebasse pears, and likewise Clingstone peaches, which had been treated according to this method; and they were much above the ordinary size of these varieties.



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